

THE AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY

ADVISORY EDITORIAL BOARD

FRED L. ADAIR
CHANNING W. BARRETT
C. L. BONIFIELD
J. WESLEY BOVÉE
W. W. CHIPMAN
JOHN G. CLARK
H. S. CROSSEN
THOMAS CULLEN
EDWARD P. DAVIS
J. B. DELEE
ROBERT L. DICKINSON
PALMER FINDLEY

ROBERT T. FRANK
GEORGE GELLHORN
ALBERT GOLDSPOHN
WILLIAM P. GRAVES
HERMAN E. HAYD
BARTON C. HIRST
E. J. ILL
J. C. LITZENBERG
F. W. LYNCH
FRANKLIN H. MARTIN
C. JEFF MILLER
GEORGE CLARK MOSHER

HENRY P. NEWMAN
GEO. H. NOBLE
REUBEN PETERSON
JOHN OSBORN POLAK
F. F. SIMPSON
HENRY SCHWARZ
J. M. SLEMONS
HOWARD C. TAYLOR
B. P. WATSON
GEORGE GRAY WARD
J. WHITRIDGE WILLIAMS

OFFICIAL ORGAN OF

THE AMERICAN GYNECOLOGICAL SOCIETY

THE AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS
NEW YORK OBSTETRICAL SOCIETY; OBSTETRICAL SOCIETY OF PHILADELPHIA; BROOKLYN
GYNECOLOGICAL SOCIETY; ST. LOUIS GYNECOLOGICAL SOCIETY; AND NEW ORLEANS GYNE-
COLOGICAL AND OBSTETRICAL SOCIETY.

Editor, GEORGE W. KOSMAK
Associate Editor, HUGO EHRENFEST

VOLUME XI
JANUARY, 1926—JUNE, 1926

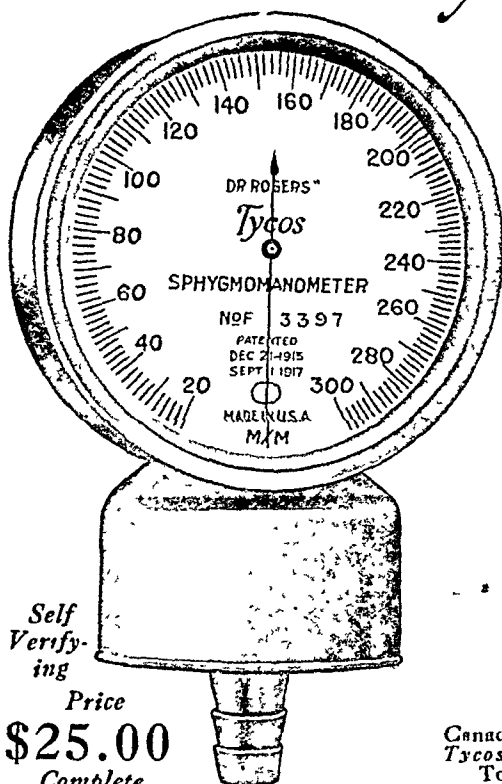
ST. LOUIS
THE C. V. MOSBY COMPANY

1926

COPYRIGHT, 1926, BY THE C. V. MOSBY COMPANY

Press of
The C. V. Mosby Company,
St. Louis

THE *Tycos* SPHYGMOMANOMETER



Provides a simple method of determining blood pressure. Recognized as embodying every essential possible in a portable manometer. Made of noncorrosive materials. No friction. Stationary dial. The return of the hand to the zero mark renders the instrument absolutely self-verifying.

Send for free booklets "Blood Pressure Manual," "Analysis of Urine," or catalog of Urinalysis Glassware. These works are authoritative and comprehensive. They should be in the library of every physician.

Taylor Instrument Companies

ROCHESTER, N. Y., U. S. A.

Canadian Plant
Tycos Building
Toronto

Manufacturing Distributors
in Great Britain
Short & Mason, Ltd., London

CONTENTS FOR JANUARY, 1926

Original Communications

The Use of Fluids in the Treatment of Hyperemesis Gravidarum. By Victor J. Harding, D.Sc., and H. B. Van Wyck, A.B., M.B., Toronto, Ont.	1
Report of a Case of Ectopia Viscerum, Rachischisis, Malformation of the Sacrum, Pelvis Inversa, Hypoplasia of the Thoracic Duct, Agensis or Hypoplasia of Various Abdominal Viscera and Placenta Previa. By Ralph G. Mills, M.D., and Bernard E. Walpert, M.D., Chicago, Ill.	19
Application of the Forceps to the Transverse Head for Delivery of Persistent Occipitoposterior Cases. By Hervey C. Williamson, M.D., New York, N. Y.	37
Heart Output During Pregnancy. By H. J. Stander, M.D., E. E. Duncan, M.D., and W. E. Sisson, M.D., Baltimore, Md.	44
Sterility-Fertility Studies in Animals and Their Bearing on Human Problems. By R. L. Dickinson, M.D., New York.....	51

(Continued on page 5.)

A corrective for Hyperidrosis

—a condition which should be controlled

Analysis of the perspiratory secretion signally fails to verify the belief, long prevalent, that the skin aids in eliminating waste products of metabolism.

The principal, if not only, utility of perspiration seems to be its cooling effect through evaporation, and in this it is essential to life.

Hyperidrosis, on the contrary, especially the exaggerated perspiration of the axilla, genital regions and extremities, is neither essential nor desirable. It, like Bromidrosis (foul sweating), while not to be classed as a disease perhaps, certainly is an infirmity which may incapacitate those afflicted. As such it demands attention.

A skin constantly macerated in decomposed perspiration will surely become tender and painful and be predisposed to eczema, prickly heat, boils and intertrigo (chafing).

Considering that sweat is always of acid reaction, it is reasonable to assume that Hyperidrosis has a direct bearing upon the chronicity of many skin diseases. Certainly sweat-dampened clothing and consequent chilled surfaces predispose to colds and allied diseases.

Aside from the esthetic reasons for controlling Hyperidrosis, there is the greater one of general bodily welfare. In this authorities agree, as they do in their preference for an effective, harmless and economical local application.

ODO-RO-NO, twice a week, meets this condition perfectly.

Originally designed by a physician for personal use, Odo-ro-no has spread to practically every race and country of the world.

It is an effective preventive of excessive perspiration as well as a deodorant. It is harmless to the skin and the health. Send for full size package—free to physicians.

ODO-RO-NO

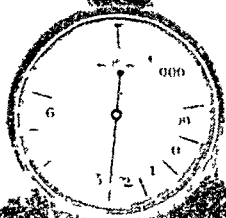
Full size package—free
to physicians—*address*



The Odorono Company, 461 Blair Ave., Cincinnati, Ohio

THE UNVARYING ACCURACY of SIZES of D & G SUTURES

is assured by use of a special ~~measuring device~~
having a magnification of 200 diameters



DAVIS & GECK INC. - 211 TO 221 DUFFIELD STREET - BROOKLYN, N. Y., U.S.A.

CONTENTS—Continued

An Investigation into the Causation of the Onset of Labor by Parabiosis During Pregnancy. By Isidor Kross, M.D., New York.....	64
Notes on the Etiology and Epidemiology of Impetigo Contagiosa Neonatorum. By David L. Belding, M.D., Boston, Mass.	70
Elimination of the Second Stage of Labor in Breech Presentations. By Frederick C. Irving, M.D., and Thos. R. Goethals, M.D., Boston, Mass.	80
Postoperative Parotitis with a Report of Cases. By Thomas C. Peightal, M.D., New York, N. Y.	88
Obstetric Mortality. An Analysis of the Cases at the Lying-In Hospital in 1924. By Meyer Rosensohn, M.D., New York, N. Y.	96
Congenital Hernia at the Linea Alba. By H. R. Charlton, M.D., Bronxville, N. Y.	103

(Continued on page 6.)

Nutritional Deficiencies

corrected by

BORCHERDT'S**Malt Cod Liver Oil and Iron Iodide**

Malt 75%, Cod Liver Oil 25%, Iron Iodide 4 Gr. in Fluid Ounce.

Malt Cod Liver Oil and Phosphorus

Malt 75%, Cod Liver Oil 25%, Phosphorus 1/25 Gr. in Fluid Ounce.

NORWEGIAN COD LIVER OIL of the finest medicinal quality is employed in the manufacture of the Borcherdts Malt and Cod Liver Oil products. This cod liver oil by physiological tests is very high in vitamin A content as well as rich in antirachitic properties.

THE BORCHERDT MALT COD LIVER OIL PRODUCTS are entirely free from alcohol, therefore particularly indicated in your children's cases requiring reinforced nutrition. The malnourished, underweight child in the nutrition class at school, responds quickly to treatment with these readily appropriated Malt and Cod Liver Oil combinations.

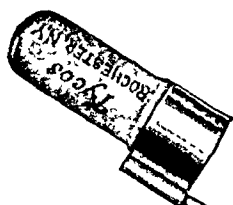
*Samples and literature on request***BORCHERDT MALT EXTRACT COMPANY****217 N. Lincoln Street - - Chicago****CONTENTS—Continued**

The Relation of Blood Sedimentation to Pelvic Disorders. By Thomas H. Cherry, M.D., F.A.C.S., New York, N. Y.	105
Report of a Case of Decidual Reaction in Adenomyoma of Rectovaginal Septum. By Richard Joseph White, M.D., Fort Worth, Texas.....	112
Report of a Case of Separation of the Dorsal Vertebrae in Podalic Version and Extraction. By W. R. Barney, M.D., Cleveland, Ohio.....	116

Society Transactions

New York Obstetrical Society, Meeting of May 12, 1925.....	118
Postoperative Parotitis, with a Report of Cases. By Dr. Thomas C. Peightal	118
Application of the Forceps to the Transverse Head for Delivery of Persistent Occipito-posterior Cases. By Dr. H. C. Williamson.....	120

(Continued on page 8.)



Tycos Fever Thermometers

Reliable, Tested Fever
Thermometers in various
styles but only one
quality—the best.

Illustration shows
safety case. Ther-
mometer cannot fall
out, and cap cannot
be lost.

Send for Medical Catalogs

Taylor Instrument Companies

ROCHESTER, N. Y., U. S. A.

Canadian Plant
Tycos Building
Toronto

Manufacturing Distributors
in Great Britain
Short & Mason, Ltd., London

CONTENTS FOR FEBRUARY, 1926

Original Communications

President's Address before the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Thirty-eighth Annual Meeting, September, 1925. By Asa B. Davis, M.D., F.A.C.S., New York, N. Y.	147
An Inquiry into the Nature of Chronic Appendicitis. By Arthur E. Hertzler, M.D., Halstead, Kansas.....	155
Inversion of the Uterus. By Louis E. Phaneuf, M.D., F.A.C.S., Boston Mass.	171
Five Kinds of Chronic Appendicitis. By Robert T. Morris, M.D., F.A.C.S., New York, N. Y.	180
Appendicitis in Pregnancy. By G. D. Royston, M.D., and A. O. Fisher, M.D., St. Louis, Mo.	184
Prolapse of the Placenta. By M. Pierce Rucker, M.D., Richmond, Va.	189
Treatment of Placenta Previa Based on a Study of 303 Consecutive Cases at the Boston Lying-In Hospital. By Foster S. Kellogg, M.D., Boston, Mass.	194
Indications for Cesarean Section. By Budd Van Sweringen, M.D., Fort Wayne, Ind.	201
The Occiput Posterior. By Percy W. Toombs, A.B., M.D., F.A.C.S., Memphis, Tennessee	206

(Continued on page 5.)

Sterilization To Be Safe Must Be Complete!

Whether it's a major surgical case or a simple office treatment the sterilization of your dressings and your instruments must be complete.

Unwrapped office rolls of gauze and cotton form a potential menace to your practice. Packages once opened are no longer completely sterile. To be on the safe side they must be resterilized before use.

Castle provides protection against these hazards in a complete line of office sterilizers that give complete and safe sterilization for dressings and instruments alike.

Our new pamphlet tells the whole story about resterilization of dressings and the sterile tray handle and never-boil-dry features of Castle sterilizers. Write for your copy today.

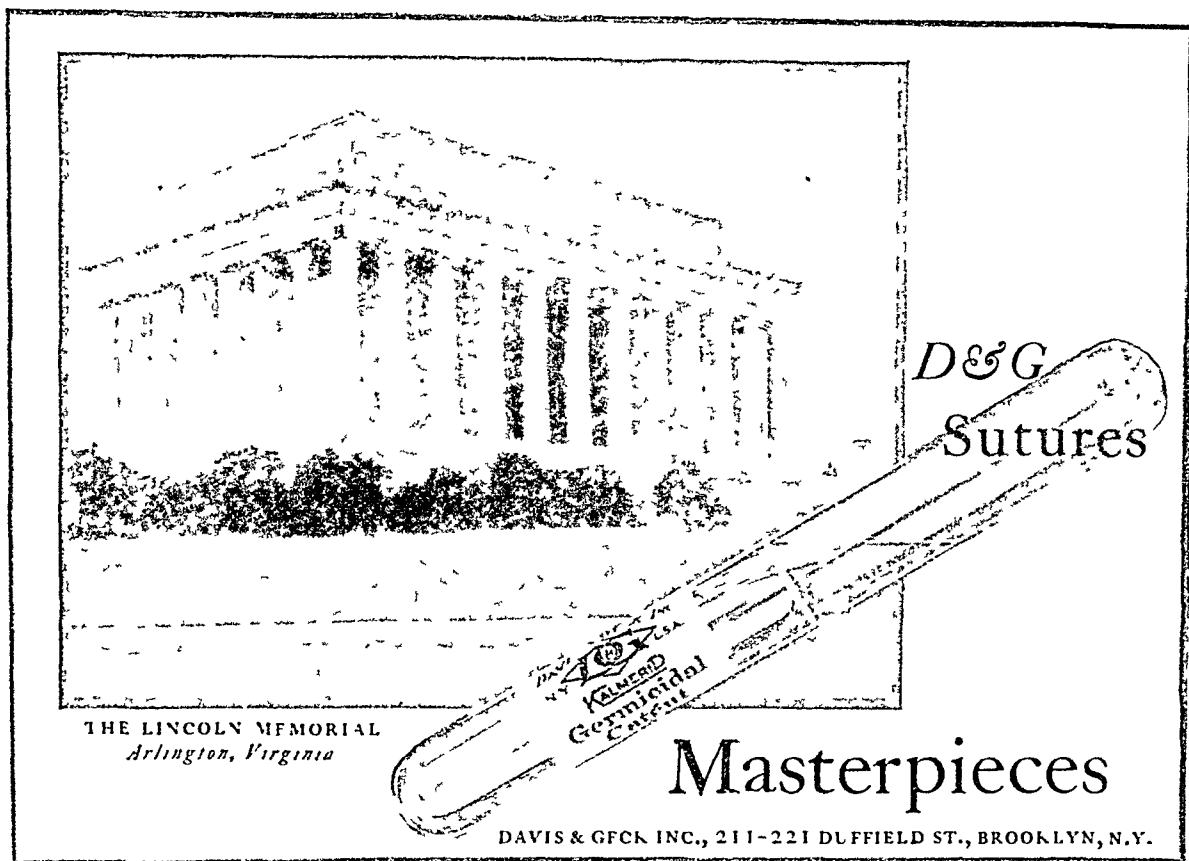
CASTLE

WILMOT CASTLE COMPANY

1146 University Ave. ROCHESTER, N. Y.

*Sterilizers for Physicians, Dentists
and Hospitals*





D&G Sutures

THE LINCOLN MEMORIAL
Arlington, Virginia

Masterpieces

DAVIS & GIECK INC., 211-221 DUFFIELD ST., BROOKLYN, N.Y.

CONTENTS—Continued

The Relation of the Physiology and Mechanics to the Management of Labor. By W. A. Fowler, M.D., F.A.C.S., Oklahoma City, Okla.	212
Preparation of the External Genitalia for Delivery with Iodine-Alcohol: Report of 100 Cases so Treated, with Bacteriologic Results. By Burnley Lankford, M.D., Norfolk, Va.	219
Observations on the Treatment of the Edema of the Toxemia of Pregnancy with Ammonium Chloride. By Robert D. Mussey, M.D., Rochester, Minnesota	222
The Intramuscular Injection of Magnesium Sulphate for the Control of Convulsions in Eclampsia. By Lee Dorsett, M.D., St. Louis, Mo.	227
The Prevention of Stillbirths. By Calvin R. Hannah, M.D., F.A.C.S., Dallas, Texas	231
Report of a Case of a Mesenteric Cyst. By Edmund D. Clark, M.D., Indianapolis, Ind.	238

Department of Maternal Welfare

Meeting of the Joint Committee, Washington, D. C., May 3, 1925....	244
--	-----

(Continued on page 6.)

Nutritional Deficiencies

corrected by

BORCHERDT'S**Malt Cod Liver Oil and Iron Iodide**

Malt 75%, Cod Liver Oil 25%, Iron Iodide 4 Gr. in Fluid Ounce.

Malt Cod Liver Oil and Phosphorus

Malt 75%, Cod Liver Oil 25%, Phosphorus 1/25 Gr. in Fluid Ounce.

NORWEGIAN COD LIVER OIL of the finest medicinal quality is employed in the manufacture of the Borchardt Malt and Cod Liver Oil products. This cod liver oil by physiological tests is very high in vitamin A content as well as rich in antirachitic properties.

THE BORCHERDT MALT COD LIVER OIL PRODUCTS are entirely free from alcohol, therefore particularly indicated in your children's cases requiring reinforced nutrition. The malnourished, underweight child in the nutrition class at school, responds quickly to treatment with these readily appropriated Malt and Cod Liver Oil combinations.

*Samples and literature on request***BORCHERDT MALT EXTRACT COMPANY****217 N. Lincoln Street - - Chicago***CONTENTS—Continued***Society Transactions**

American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Thirty-eighth Annual Meeting, Hot Springs, Va., September 16, 17 and 18, 1925.....	247
Symposium on Appendicitis.....	247
Five Kinds of Chronic Appendicitis. By Dr. Robert T. Morris.....	247
Chronic Appendicitis Considered from the Clinical and Pathologic Standpoint. By Dr. Arthur E. Hertzler.....	247
Appendicitis in Pregnancy. By Dr. G. D. Royston.....	247
Right Rotation of the Appendix from Congenital Bands as a Factor in the Etiology of Appendicitis. By Dr. John H. Outland.....	247
Symposium on Placental Pathology.....	252
Case Report of Prolapse of the Placenta. By Dr. M. Pierce Rucker.....	252
Treatment of Placenta Previa Based on 303 Consecutive Cases at the Boston Lying-In Hospital from 1895 to 1925. By Dr. Foster S. Kellogg	252
Inversion of the Uterus. By Dr. Louis E. Phaneuf.....	252
Symposium on the Mechanics of Labor.....	256

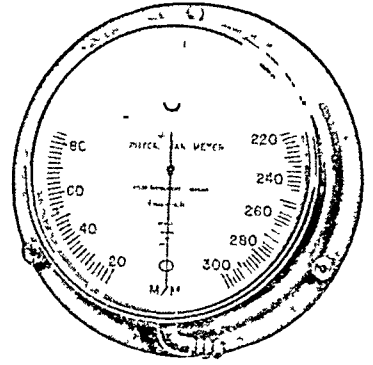
(Continued on page 8.)

Tycos

Office Type

Sphygmomanometer

For Cardiac and Circulatory
Efficiency Tests



Crampton's test of Vasomotor efficiency; Goodman and Howell's test for myocardial efficiency; Graupner's; Barringer's; Katzenstein's or whatever test you may choose will be facilitated by the use of the *Tycos* Office Type Sphygmomanometer. The pulse rate is counted direct from the dial. Blood pressure is accurately determined immediately at the termination of the applied load. It gives valuable information on amplitude and

regularity. The easiest and most accurate method of determining blood pressure is with the *Tycos* Office Type Sphygmomanometer.

Send for our Blood Pressure Manual; also, for Bulletin 4 on the Analysis of Urine.

Taylor Instrument Companies

ROCHESTER, N. Y., U. S. A.

CANADIAN PLANT, TYCOS BLDG., TORONTO

MANUFACTURING DISTRIBUTORS IN GREAT BRITAIN
SHORT & MASON, LTD., LONDON

CONTENTS FOR MARCH, 1926

Original Communications

Shock in the Pregnant and Puerperal Woman. By Harold Bailey, M.D., and William P. Driscoll, M.D., New York, N. Y.	287
Lipoma of the Broad Ligament, with the Report of a Case. By Reginald M. Rawls, M.D., F.A.C.S., New York, N. Y.	305
The Use of the Vaginal Stethoscope in the Early Diagnosis of Pregnancy. By F. H. Falls, M. D., Iowa City, Iowa.....	309
Dilation of the Cervix Uteri by Means of the Hydrostatic Balloon. By Emerson L. Stone, M.D., Baltimore, Md.	314
Obstetrical Heresies at the Brooklyn Hospital. By William Sidney Smith, M.D., F.A.C.S., Brooklyn, N. Y.	324
The Incompatibility of Pregnancy and Fibroids of the Uterus. By George Clark Mosher, M.D., Kansas City, Mo.	334
Treatment of Fibroids of the Uterus. By Edward A. Weiss, M.D., F.A.C.S., Pittsburgh, Pa.	343

(Continued on page 5.)

Eliminate Breast Troubles

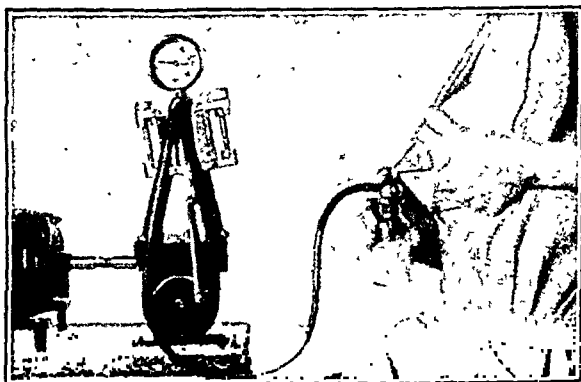
When you want to stimulate Milk secretion rapidly,
When you want to re-establish full production in dry breasts,
When you have trouble with sore or inverted nipples,
When all other means of milk expression utterly fail,

Use Dr. I. A. Abt's Electric Breast Pump

This apparatus reproduces the massaging action of the nursing infant and increases the milk supply with remarkable rapidity.

It will start lactation where not a drop of milk can be obtained by other means, and it will bring back full milk supply where other pumps are drying up the breasts.

The milk is expressed under complete asepsis and the number of infections is materially reduced.



Milk Is Drawn Directly into Bottle

*It has saved many premature infants' lives
and much suffering of mothers*

Breasts are emptied rapidly and completely without any discomfort to the patient, even in cases of painful caking or engorgement.

Cracked nipples heal up within a few days while the machine expresses the milk painlessly.

Used successfully in leading Hospitals throughout the country.
Among them

NEW YORK
Nursery & Child's
Post Graduate
Lying-in
Fifth Avenue
Woman's
Manhattan Maternity
Jewish Maternity

CHICAGO
Lying-in
Michael Reese
Mercy
Saint Luke's
Presbyterian
Wesley Memorial
Grant

PHILADELPHIA
U. of Pennsylvania
Howard
Jefferson
W. Phila. for Women
Kensington

LOS ANGELES
Good Samaritan
General
Cal. Lutheran
Kaspere Kohn
Hollywood

WASHINGTON
Garfield Memorial
Columbia
Sibley Memorial

BALTIMORE
Johns Hopkins
Hebrew
Maryland General

DETROIT
Harper
Herman Klefer
Grace
Woman's
Henry Ford

BUFFALO
Children's
General
Millard Fillmore
Ingleside Home
Deaconess

Sign this Coupon Today

(Ob. 3)
EDWARD LASKER COMPANY
225 Rider Ave., New York.

Please send me full particulars on
Dr. Abt's Electric Breast Pump and
on your free trial offer and rental
service.

Dr. _____
Address _____
_____ Hospital.

We ship machines on

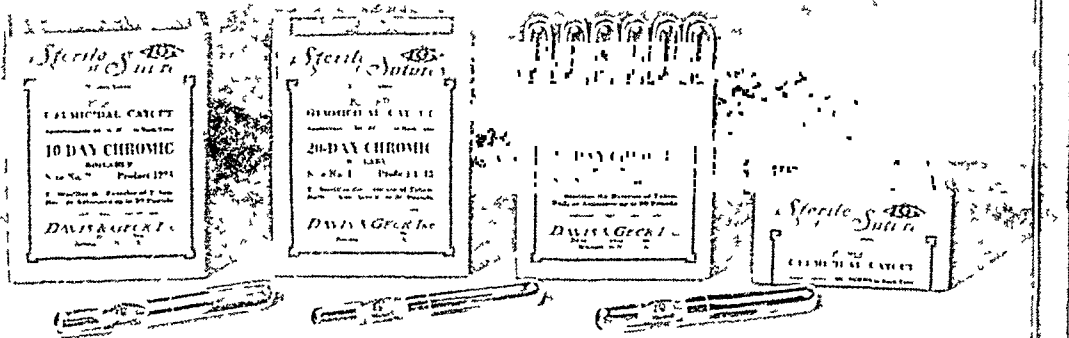
30 Days Free Trial
to any Hospital

and we rent them to patients

Sole Representatives for Canada

INGRAM & BELL, LIMITED
Toronto—Montreal—Calgary

You can depend on the accuracy of D & G chromic catgut. Irrespective of size, the 10-, 20-, or 40-day sutures maintain apposition in muscle or fascia for their predetermined time



DAVIS & GECK INC. • 211 TO 221 DUFFIELD STREET • BROOKLYN, N.Y., U.S.A.

CONTENTS—Continued

The Sedimentation Test in Pelvic Diseases of the Female. By Henry Schmitz, A.M., M.D., and Herbert Schmitz, B.S., Chicago, Ill.	353
The Danger of Malformation of Fetus in Roentgen-Ray Treatment During Pregnancy. By Emil Ries, M.D., Chicago, Ill.	361
On Contraction and Retraction Rings. By Clifford White, M.D., London, F.R.C.P., (Lond.), F.R.C.S., (Eng.).....	364
Torsion of the Normal Fallopian Tube. By H. Laurant Darner, M.D., Rochester, N. Y.	368
Chancre of the Cervix, with a Report of Two Cases. By Roland S. Cron, M.D., Milwaukee, Wis.	378
Cystadenoma of the Ovary, with Report of Cases. By George A. Mayer, M.D., F.A.C.S., New Orleans, La.	383
A Critical Analysis of 250 Prenatal Charts. By J. S. Hebert, M.D., New Orleans, La.	387
Full-Term Extrauterine Pregnancy, with Report of Three Cases. By Lucien A. LeDoux, M.D., New Orleans, La.	395
Surgery, Radium and Roentgen Rays in the Treatment of Carcinoma of the Cervix. By Harry H. Bowing, M.D., Rochester, Minn.	400

(Continued on page 6.)

Nutritional Deficiencies

corrected by

BORCHERDT'S**Malt Cod Liver Oil and Iron Iodide**

Malt 75%, Cod Liver Oil 25%, Iron Iodide 4 Gr. in Fluid Ounce.

Malt Cod Liver Oil and Phosphorus

Malt 75%, Cod Liver Oil 25%, Phosphorus 1/25 Gr. in Fluid Ounce.

NORWEGIAN COD LIVER OIL of the finest medicinal quality is employed in the manufacture of the Borchardt Malt and Cod Liver Oil products. This cod liver oil by physiological tests is very high in vitamin A content as well as rich in antirachitic properties.

THE BORCHERDT MALT COD LIVER OIL PRODUCTS are entirely free from alcohol, therefore particularly indicated in your children's cases requiring reinforced nutrition. The malnourished, underweight child in the nutrition class at school, responds quickly to treatment with these readily appropriated Malt and Cod Liver Oil combinations.

*Samples and literature on request***BORCHERDT MALT EXTRACT COMPANY****217 N. Lincoln Street - - Chicago*****CONTENTS—Continued*****Society Transactions**

American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Thirty-Eighth Annual Meeting, Hot Springs, Va., September 16, 17, and 18, 1925.....	401
The Incompatibility of Pregnancy and Fibroids in the Uterus. By Dr. George C. Mosher.....	404
The Treatment of Fibroids of the Uterus, A Comparative Study of Two Five Year Periods. By Dr. Edward A. Weiss.....	404
Blood Sedimentation in Pelvic Infections. By Dr. Henry Schmitz.....	409
The New York Obstetrical Society, Meeting of October 13, 1925.....	410
Lipoma of the Broad Ligament. By Dr. R. M. Rawls.....	410
Complete Inversion of the Uterus. By Dr. Frank R. Oastler.....	410
Inversion of Uterus. By Dr. F. C. Holden.....	412
Obstetrical Heresies at the Brooklyn Hospital. By Dr. W. S. Smith....	414

(Continued on page 8.)

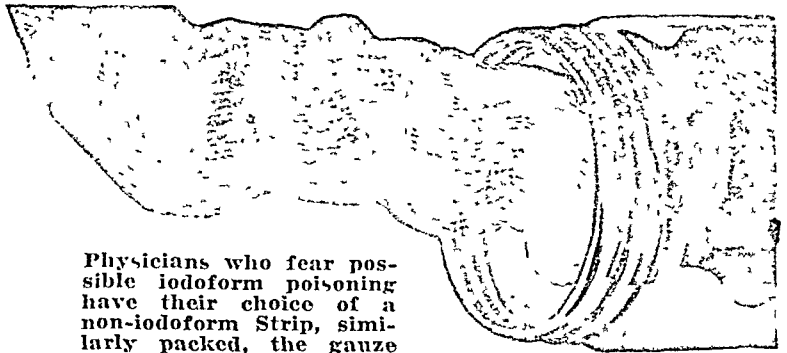
When Post-Partum Hemorrhage Occurs,

one of the best measures at the command of the attending physician is immediate and liberal stuffing of the bleeding uterus.

The Post-Partum Uterine Packing Strip has been designed in every way best to meet these requirements.

It consists of 10 yards of Iodoform Gauze (5%), of suitable bulkiness, 8 inches wide folded to 1 inch, easily introduced into the canal. In extreme cases two Strips may be tied together to provide 20 yards of continuous packing. The glass tube assures protection to contents and offers quick access to either screw-cap end.

While it is fortunate that this complication arises comparatively infrequently, it is nevertheless an ever-present possibility, and the physician who always carries in his obstetrical bag one or two Post-Partum Uterine Packing Strips sooner or later is very glad of his foresight.



Physicians who fear possible iodoform poisoning have their choice of a non-iodoform Strip, similarly packed, the gauze being moist borated, steam sterilized. Each strip is put up in a long glass tube well packed for the bag, convenient for emergency use.

Johnson & Johnson
NEW BRUNSWICK, N. J., U. S. A.

JOHNSON & JOHNSON,
New Brunswick, N. J., U. S. A.
Gentlemen: Please fill this emergency order for Post-Partum Uterine Packing Strips with iodoform or without iodoform and bill through...
..... My Druggist or Dealer
City.....
State.....
..... M. D.

CONTENTS FOR APRIL, 1926

Original Communications

The Radium Treatment of Carcinoma Uteri. By George Gray Ward, M.D., and Lillian K. P. Farrar, M.D., New York, N. Y.	439
Precancerous Lesions of the Uterus. By Palmer Findley, M.D., F.A.C.S., Omaha, Neb.	450
Cervicitis, Erosion and Laceration of the Cervix Uteri from the Standpoint of Pathology. By G. L. Moench, M.D., New York, N. Y.	453
Endometrial Adenoma (Implantation) in the Vermiform Appendix. By M. G. Seelig, M.D., St. Louis, Mo.	461
Extrameatal Prolapse of the Urethra, with the Report of a Case Having an Acute Onset. By Walter T. Dannreuther, M.D., F.A.C.S., New York, N. Y.	468
Weight Estimates During Pregnancy and the Puerperium. By William Kerwin, M.D., F.A.C.S., St. Louis, Mo.	473
Injuries of the Infant During Delivery. By P. Brooke Bland, M.D., Philadelphia, Pa.	477
Vulvovaginitis in Infants and Young Children. By Philip F. Williams, M.D., Philadelphia, Pa.	487
Duodenal Ulcer from Partial Obstruction at the Duodenojejunal Junction. By Edwin P. Sloan, M.D., Bloomington, Ill.	492

(Continued on page 5.)

*Every one has faith
in Castle sterilization*

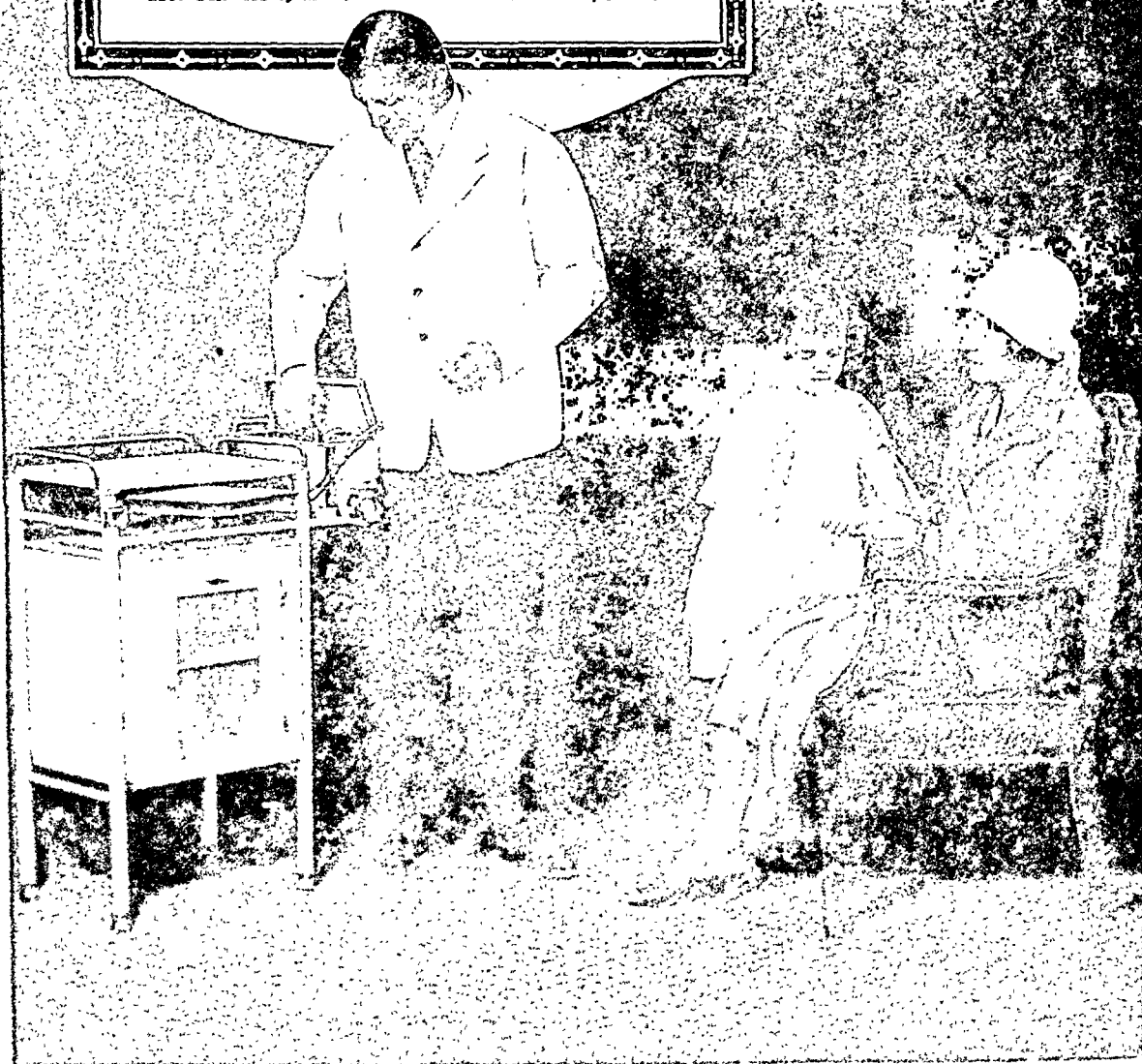
Doctors and patients alike wish to be positive of protection against infection from outside sources, even in minor treatments. It is such a simple matter to visually demonstrate your thoughtful care when you have a Castle sterilizer.

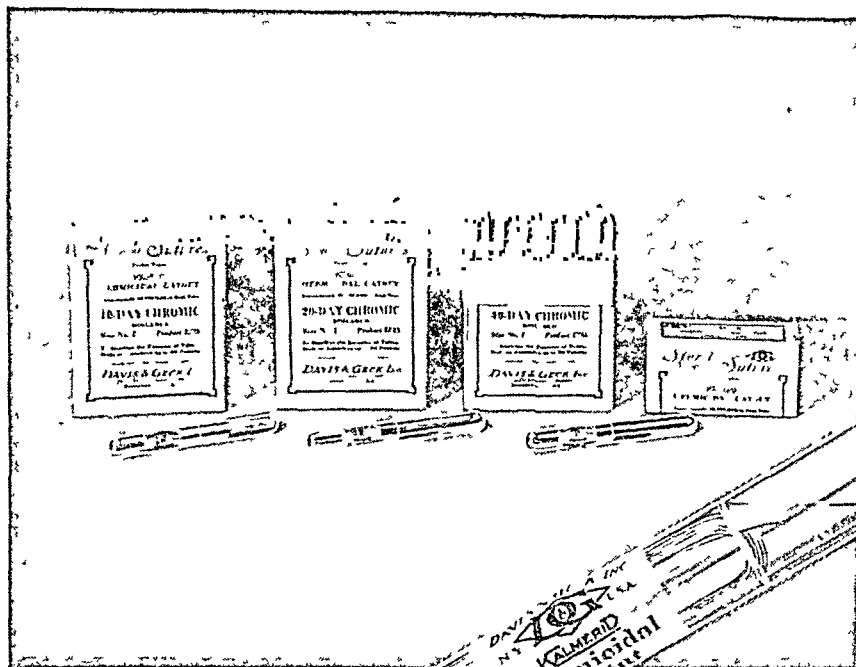
*If your sterilizer is not what
it might be, send for the
helpful Castle catalog.*

CASTLE

Sterilizers for Physicians, Dentists and Hospitals
1146 University Ave. Rochester, N. Y.

CASTLE





D&G
Sutures

Irrespective of the size, all 10-, 20-, or 40-day sutures maintain apposition in muscle or fascia for their predetermined time.

Correct Absorption

DAVIS & GECK INC. ◊ 211 TO 221 DUFFIELD STREET ◊ BROOKLYN, N.Y., U.S.A.

CONTENTS—Continued

On a Possible Cause for Pemphigus Neonatorum. A Preliminary Report. By Roy E. Krigbaum, M.D., Columbus, Ohio.....	494
A Method of Obtaining Vaginal Secretion for Bacteriologic Examination without the Possibility of Vulval Contamination. By John W. Harris, M.D., and J. Howard Brown, Ph.D., Baltimore, Md.	497
Spontaneous Rupture of the Uterus in Labor Following Sturmdorf Tracheloplasty. By Nicholson J. Eastman, A.B., M.D., Peking, China.....	500
Intraperitoneal Hemorrhage Complicating Abortion. By Wendell L. Downing, M.D., Le Mars, Iowa.....	503
Supernumerary Breast near Labium. By J. Warren Bell, M.D., Ph.D., Minneapolis, Minn.	507
Report of a Case of Gangrene of the Cecum in a Newborn Infant. By Lucius A. Wing, M.D., New York, N. Y.	510
Report of a Case of True Ovarian Pregnancy. By James R. Manley, M.D., Duluth, Minn. .	512

Department of Maternal Welfare

The District Nursing Association of Buffalo.....	514
--	-----

Society Transactions

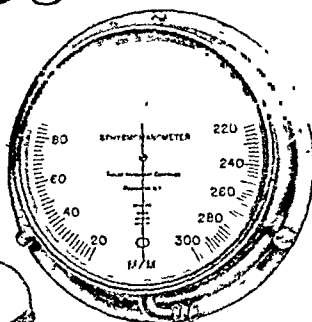
American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Thirty-eighth Annual Meeting, Hot Springs, Virginia, Sept. 16, 17 and 18, 1925	516
--	-----

(Continued on page 6.)

Tycos Sphygmomanometers

Tycos Fever Thermometer
Tycos Urinalysis Glassware
Tycos Pocket Sphygmomanometer

Blood Pressure Manual
sent free

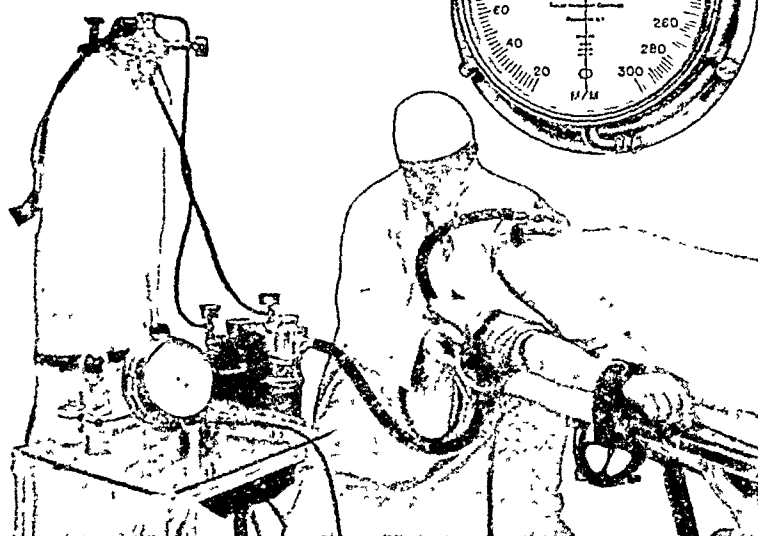


Office Type

Easy, long distant readings. Large dial and figures. Dependable.

Use of the *Tycos* Sphygmomanometer in the operating room is very valuable, as it gives warning of a depleted vitality some time before the patient registers depletion physically.

Invaluable in the office as well as the operating room.



Canadian Plant
Tycos Building
Toronto

Taylor Instrument Companies
POCHESTER, N. Y., U. S. A.

Manufacturing Distributors
in Great Britain
Short & Mason, Ltd., London

CONTENTS—Continued

Report of the Joint Committee on Maternal Welfare.....	516
Precancerous Lesions in the Uterus. By Dr. Palmer Findley.....	519
A Case of Gangrene of the Cecum in a Newborn Infant. By Dr. Lucius A. Wing	521
Extrameatal Prolapse of the Urethra. By Dr. W. T. Dannreuther....	522
Duodenal Ulcer from Partial Obstruction of the Duodenojejunal Junction. By Dr. E. P. Sloan.....	523
Obstetrical Society of Philadelphia, Meeting of May 7, 1925.....	523
Symposium on the Obstetric Forceps.....	523
Dr. Wm. E. Studdiford demonstrated the Instrument of Barton, of Plattsburg, N. Y.	523
Dr. Richard C. Norris described the Dewees Forceps.....	523
Kielland Forceps. By Dr. E. A. Schumann.....	523
A Special Instrument Designed for Use on the Aftercoming Head. By Dr. E. B. Piper.....	523
Observations Upon the Use of the Kielland Forceps. By Dr. E. A. Schumann	525
Joint Meeting of the Obstetrical Society of Philadelphia and the Philadelphia Pediatric Society, November 10, 1925.....	529
Injuries to the Infant during Delivery. By Dr. P. Brooke Bland.....	529
Vulvovaginitis in Infants and Young Children. By Dr. P. F. Williams	529
A Delivery Room Mirror. By Howard F. Kane, A.B., M.D., F.A.C.S., Washington, D. C.	533

(Continued on page 8.)



For Immediate Repair of the Perineum

Obstetricians who prefer an absorbable material will be interested in this Obstetrical Suture, Chromic Catgut. It has been specially chromicized to hold usually for 7 to 10 days in spite of the action of the lochia, so that the apprehensive patient may be assured that "there will be no stitches to take out".

Incidentally, it has the convenience of being threaded on a suitable curved needle. It may be boiled with the instruments and is always ready for immediate use. Supplied one in a box, handy for the bag, through surgical supply dealers.

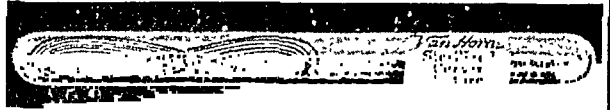
CERVIX SUTURES

will be found by gynecologists to be a reliable, absorbable suture material for the cervix uteri, vaginal mucous membrane, rectum, kidney, bladder, and for secondary perineal repair.

In this class of work, it generally resists absorption for 10 to 12 days, and is safer than ordinary chromic catgut.

Supplied 3 tubes in a box, for sale through surgical supply dealers.

Johnson & Johnson
NEW BRUNSWICK, N. J., U. S. A.



SAMPLE COUPON

JOHNSON & JOHNSON,
New Brunswick, N. J., U. S. A.

Please send sample of ☐ Cervix Suture.
☐ Obstetrical Suture, Chromic Catgut.

.....M. D.

StreetCity

.....
Supply Dealer's Name

CONTENTS FOR MAY, 1926

Original Communications

- A Classification of the Toxemias of the Latter Half of Pregnancy. By H. J. Stander, M.D., and C. H. Peckham, M.D., Baltimore, Md. 583
- Report of a Case of Actinomyces of the Tubes and Ovaries. By Joseph W. Draper, M.D., and W. E. Studdiford, Jr., M.D., New York, N. Y. 603
- Diverticulitis of the Colon. By John F. Erdmann, M.D., New York City.... 609
- Oviduct Insufflation, Based on a Study of 400 Cases. By A. J. Rongy, M.D., New York, N. Y. 616
- A Study of End-Results of Operations for Uterine Prolapse at the Woman's Hospital, 1915-1925. By Edward Arthur Bullard, M.D., New York, N. Y. 623
- Infection of the Abdominal Incision, Incidence in Five Hundred Gynecologic Laparotomies. By Catharine Macfarlane, M.D., F.A.C.S., Philadelphia, Pa. 630
- Blood Pressure and Urinary Findings in 100 Cases of Normal Pregnancies. By Francis Ashley Faught, M.D., Philadelphia, Pa. 633
- The Passive Hyperemia Treatment of Chronic Cervicitis. By G. L. Moench, M.D., New York, N. Y. 637

(Continued on page 5.)

A NEW BOOK IN OBSTETRICS

THE X-RAY — IN — EMBRYOLOGY AND OBSTETRICS

By

W. A. NEWMAN DORLAND, A.M., M.D., F.A.C.S.

Professor of Gynecology and Obstetrics and Head of the Department of Obstetrics in the Post-Graduate Medical School of Chicago; Lieutenant Colonel in the Medical Reserve Corps, U. S. Army; Etc., Etc.

and

MAXIMILIAN JOHN HUBENY, M.D., F.A.C.R., F.A.C.P.

Editor of RADIOLOGY; Director of the Department of Radiology of the Physicians and Surgeons Institution; Consulting Radiologist to the Grant, Henrotin, and Polyclinic Hospitals of Chicago; Past Consulting Radiologist to Cook County Hospital, Etc.

With An Introduction by

GEORGE W. BARTELMEZ, Ph.D.

University of Chicago, Chicago, Illinois

THE authors of this book are well and favorably known in the medical profession in this country and abroad. Their names alone are a guarantee of the thoroughness and excellence of the work.

This is the first attempt at the systematic application of the X-rays to embryology, minute anatomy and obstetrics ever presented to the profession. The material is all new and is beautifully and extensively illustrated.

It matters not whether you are a roentgenologist, obstetrician, gynecologist, surgeon or family physician, you will be better equipped to efficiently serve your patient after reading Dorland and Hubeny's Obstetrical Roentgenology. It contains more pertinent material than any other publication. The context deals with embryology, normal pregnancy including different positions, pelvimetry, multiple pregnancy, and abnormalities such as anencephaly, hydrocephaly, etc., etc.

*Cloth Binding, 420 Pages, 321 Half Tone Illustrations
Price \$10.00*

Ask Your Bookseller, or Direct from the Publishers

THE BRUCE PUBLISHING COMPANY

(Publisher of RADIOLOGY, Official Journal Radiological Society of North America)

400-4 Guardian Life Building, Saint Paul, Minn.

BRUCE PUBLISHING COMPANY,

400-404 Guardian Life Building, Saint Paul, Minn.

(Am. Jr. O. & G.)

Please send me a copy of Dorland and Hubeny's X-RAY IN EMBRYOLOGY AND OBSTETRICS, for which I enclose \$10.00, or send C. O. D. Postpaid.

Name

Address



*D&G
Sutures*

D & G Sutures are always found neutral under the most delicate titration tests—another reason why they behave well in the tissues.

Always Neutral

DAVIS & GECK INC. ♡ 211 TO 221 DUFFIELD STREET ♡ BROOKLYN, N.Y., U.S.A.

CONTENTS—Continued

The Conduct of Labor After Cesarean Section. By Addley H. Gladden, Jr., M.D., F.A.C.S., New Orleans, La.	642
The Mechanics of Birth Injuries, Their Cause and Prevention. By J. W. Newman, M.D., F.A.C.S., and Walter E. Levy, M.D., F.A.C.S., New Orleans, La.	645
Obstetric Shock. By Emerson L. Stone, M.D., New Haven, Conn.	650
Ligation of the Inferior Vena Cava. By O. G. Pfaff, M.D., Indianapolis, Ind.	660
On the Need for a Urologic Department in Every Gynecologic Clinic. By Harbeck Halsted, M.D., and Ira Wilens, M.D., New York, N. Y.	664
Large Fibromyoma of Cervix: Case Report. By Frederick Christopher, M.D., F.A.C.S., Winnetka, Ill.	668

Department of Maternal Welfare

The Development of Prenatal Care in Detroit. By Walter E. Welz, M.D., Detroit, Mich.	671
---	-----

Society Transactions

American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Thirty-eighth Annual Meeting, Hot Springs, Va., September 16, 17 and 18, 1925	682
--	-----

(Continued on page 6.)

Care of the Teeth During Pregnancy

Nothing is more important during pregnancy than to properly care for the teeth of the expectant mother.

This includes the selection and recommendation of a dentifrice that can be depended upon.



REVELATION TOOTH POWDER dissolves deposits that are liable to accumulate, prevents fermentation, and keeps the enamel highly polished.

REVELATION contains no glycerine, acid, grit or a corrosive compound.

TRY IT when recommending a tooth powder in your next obstetric case.

TO GET A FULL TRIAL SIZE CAN of Revelation for test purposes, all you need to do is to write your name and address plainly in the space below and mail to us.

AUGUST E. DRUCKER CO.,
2679 California Street, San Francisco, California
Please mail me a full-size trial can of REVELATION Tooth Powder.

Name.....

Address.....

(Obstet. Jour.)

CONTENTS—Continued

Ligation of Inferior Vena Cava. By Dr. O. G. Pfaff.....	682
Diverticulitis of the Colon. By John F. Erdmann.....	682
Oviduct Insufflation: A Study Based upon 400 Cases. By Dr. A. J. Rongy	685
The New York Obstetrical Society, Meeting of November 10, 1925.....	688
The End-Results of Operations for Uterine Prolapse at the Woman's Hospital 1915-1925. By Dr. E. A. Bullard.....	688
Obstetrical Society of Philadelphia, Meeting of December 3, 1925.....	690
Radium Treatment of Cancer of the Uterus. By Dr. George Gray Ward	691
Infection of the Abdominal Incision in 500 Gynecologic Laparotomies. By Dr. Catharine Macfarlane.....	692
Blood Pressure and Urinary Findings in 100 Cases of Normal Pregnancy. By Dr. Francis A. Faught.....	693
The New Orleans Gynecological and Obstetrical Society. Meeting of December 10, 1925	695
Macerated Premature Twins with Six True Knots of the Cord. By Hubbard E. Miller.....	695

(Continued on page 8.)

An Adequate Maternity Packet

for patients of moderate means

is now available, upon physicians' requests, at local drug stores.

It contains only the essentials (19 articles) and retails at a price to fit the purse of persons of limited means.

Johnson & Johnson
NEW BRUNSWICK, N.J., U.S.A.

Coupon

Johnson & Johnson.

New Brunswick, N. J.

Please send me list of contents
Simpson's Maternity Packet

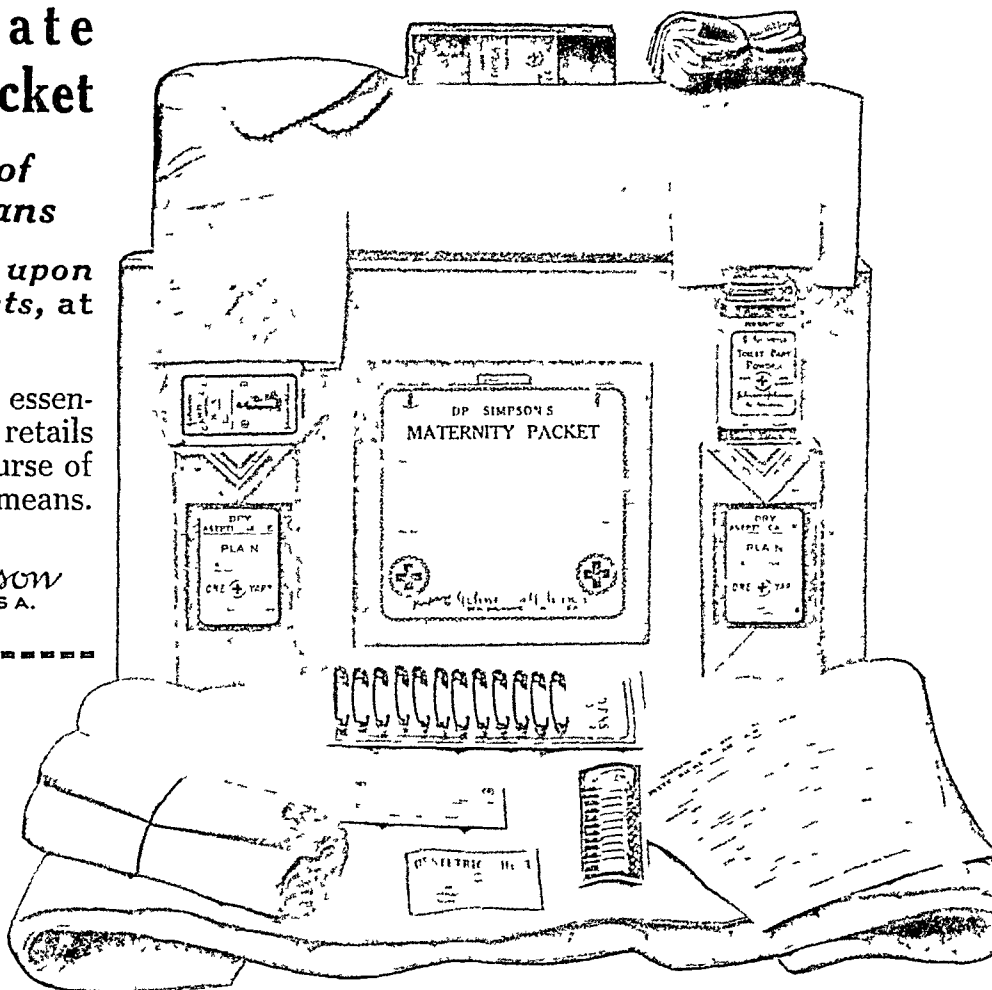
MD

Street

City

State

Name of Druggist



CONTENTS FOR JUNE, 1926

Original Communications

- | | |
|--|------------|
| A Statistical Study of the Incidence and Treatment of Labor Complicated by Contracted Pelvis in the Obstetric Service of the Johns Hopkins Hospital from 1896 to 1924. By J. Whitridge Williams, M.D., and Ko Chi Sun, M.D., Baltimore, Md. | 737 |
| The Improved Prophylactic Method of Treating Eclampsia, with Comments on the Variations Suggested by Williams, Stander, Speidel, and King. By B. Stroganoff, M.D., Leningrad, Russia. | 756 |
| Glucose and Insulin in the Toxemias of Pregnancy. By C. Jeff Miller, M.D., F.A.C.S., New Orleans, La. | 763 |
| Phocomelus with Congenital Cystic Elephantiasis. By H. A. Harris, M.B., B.S., St. Louis, Mo. | 767 |
| Janiceps Asymmetros, with the Report of a Case. By George T. Pack, B.S., M.D., and Ivan C. Berrey, B.S., M.D., University, Alabama. | 779 |
| Sebaceous Glands in the Human Nipple. By Orman C. Perkins, A.M., M.D., and Adam M. Miller, A.B., A.M., Brooklyn, N. Y. | 789 |

(Continued on page 5.)

WHAT IS "LACTOGEN"?

What We Claim

What Medical Authorities State

The Proof

1. That Lactogen is manufactured according to the right process.	McLean and Fales in the 1925 edition of "Scientific Nutrition in Infancy and Early Childhood," page 131, state: that dried milks manufactured according to the spray process have the vitamins unaffected. "The protein is not precipitated and when water is added to this milk powder, a complete solution occurs, giving a product which exactly resembles the original milk."	The Spray Process is the one employed in the manufacture of Lactogen.
2. That Lactogen when diluted for infant feeding resembles human milk more closely than any other dried milk on the market.	According to Dunn, "Pediatrics," 1917, 2nd edition, the average analysis of human milk is: Butter fat.....3.0 to 4.0% Lactose.....6.0 to 7.0% Protein.....1.0 to 2.0% Mineral salts.....0.2% Moisture.....86.8 to 89.8%	The analysis of Lactogen when diluted one part to seven of water is: Butter fat.....3.12% Lactose.....6.66% Protein.....2.02% Mineral salts.....0.44% Moisture.....87.76%
3. That the chief nutritional elements in Lactogen correspond grossly to the nutritional elements in human milk.	McLean and Fales in their "Scientific Nutrition in Infancy and Early Childhood," page 131, state: "The nutritive values are uninjured, in fact, probably improved, both because of alteration in the protein and because the size of the fat globules is reduced by the processing."	According to Holt, "Disease of Infancy and Childhood," page 178, one ounce of human milk contains 20 calories. According to McLean and Fales, "Scientific Nutrition in Infancy and Early Childhood," page 162, one ounce of Lactogen when diluted for infant feeding (1 to 7) contains 19.4 calories.
4. That the fat globules in Lactogen are reduced to such a minute size as to lessen very markedly any possibility of fat indigestion.	Alice D. Weber, in "Archives of Pediatrics," November issue, 1925, states: "Dried milk is easily and completely assimilated." McLean and Fales, 1925 edition of "Scientific Nutrition in Infancy and Childhood," state: "Dried milk is often much better tolerated than is fresh milk by the delicate infant, or infant whose digestive tract is in an abnormal state after a digestive disturbance."	Repeated tests in our laboratory have shown that the fat globules in Lactogen, even after the food is diluted for feeding, remain in a more finely divided state than the fat globules in either human or cow's milk.
5. That the fat percentage in Lactogen is standardized to an amount slightly lower than that found in human milk.	Kerley ("Practice of Pediatrics") states: that in modifying cow's milk for infant feeding, you must reduce the fat slightly below that found in human milk.	According to Dunn, the average amount of butter fat found in human milk is 3 to 4%. The butter fat content in Lactogen when diluted (1 to 7) is 3.12%.
6. That the protein content in Lactogen closely resembles that of human milk.	Kerley ("Practice of Pediatrics") states: that in modifying cow's milk for infant feeding, the protein must be reduced and the sugar must be increased.	In Lactogen the protein content is lowered by the addition of lactose. The caseinogen, which is a most important food containing organic phosphorus, does not curdle in large lumps, but forms fine, flocculent curds.
7. That the essential vitamins are present in Lactogen.	Modern scientific research has established that certain accessory food factors, known as vitamins, must be present in food in order to maintain healthy growth and to prevent deficiency diseases. A. D. Weber, "Archives of Pediatrics," November, 1925, page 743, states: that the British research committee on vitamins has shown that dried milk contains fat soluble "A" and water soluble "B" in abundance.	Long and careful laboratory investigations, supplemented by actual animal experimentation, show that Vitamin "A" and Vitamin "B" are definitely present and unimpaired in Lactogen. Vitamin "C" is not so markedly present, but as human milk or cow's milk is not rich in Vitamin "C", the use of fresh fruits and fresh vegetables is recommended.



Samples and literature mailed to physicians upon request — Nestlé's Food Company, Inc.

130 William St., New York City

NESTLÉ'S FOOD COMPANY, Inc., 130 William St., New York

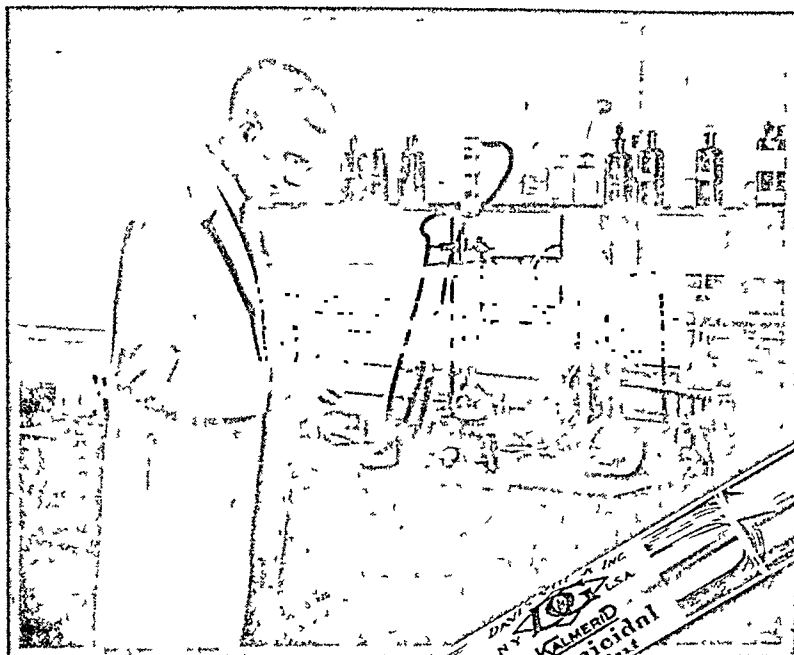
Please send me without charge complete information on "Lactogen," together with samples.

Name..... Town or City.....

Street..... State.....

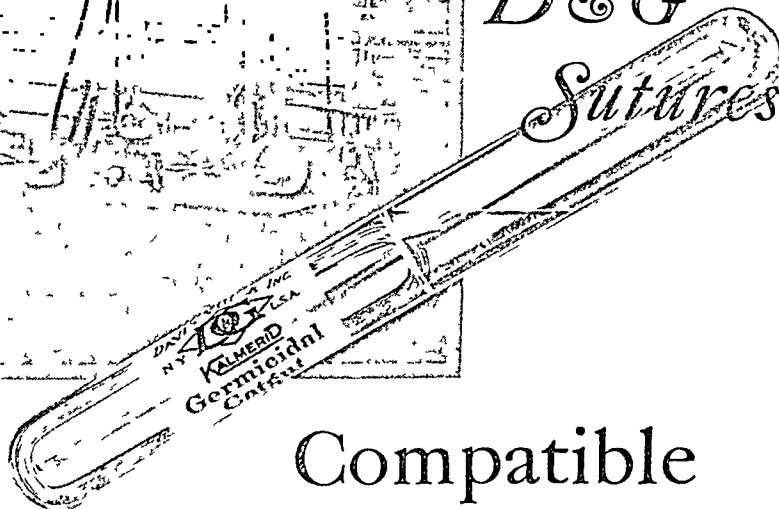
Direct orders in Canada please to NESTLÉ'S FOOD COMPANY
of Canada, Ltd., 84 St. Andrew Street, Montreal

16-1-6



D & G
Sutures

D & G Sutures are free from all irritant fats and fatty acids, as systematically verified by laboratory tests.



Compatible

DAVIS & GECK INC. ~ 211 TO 221 DUFFIELD STREET ~ BROOKLYN, N.Y., U.S.A.

CONTENTS—Continued

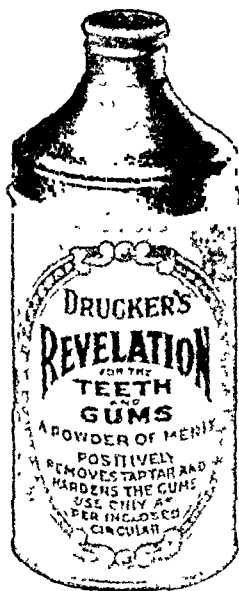
Outlet Pelvimetry and Its Importance. By C. O. McCormick, A.B., M.D., Indianapolis, Ind.	791
The Radiotherapeutic Menopause: Its Significance and Management. By James A. Corscaden, M.D., New York, N. Y.	803
An Analysis of Seventy-nine Cases of Placenta Previa. By Barnard L. Lieberman, B.S., M.B., Detroit, Mich.	814
The Protection of the Perineum. By Antonio Villarma, M.D., Manila, P. I. ..	823
The Vomiting of Pregnancy, Its Causation and Its Treatment by Ovarian Extract. By Philips J. Carter, M.D., F.A.C.S., New Orleans, La.	828
Cistern Puncture in Intracranial Birth Injuries. By Berman S. Dunham, M.D., Toledo, Ohio	833
A Case of Fetal Dystocia. By Herbert Thoms, M.D., F.A.C.S., New Haven, Conn.	839
Ablatio Placentae. By Walter E. Welz, M.D., Detroit, Mich.	842
Purpura Hemorrhagica Complicating Pregnancy. By Philip Liebling, M.D., New York	847
Syphilis of the Placenta in the Negro. By James R. McCord, M.D., Atlanta, Ga.	850

(Continued on page 6.)

Care of the Teeth During Pregnancy

Nothing is more important during pregnancy than to properly care for the teeth of the expectant mother.

This includes the selection and recommendation of a dentifrice that can be depended upon.



REVELATION TOOTH POWDER dissolves deposits that are liable to accumulate, prevents fermentation, and keeps the enamel highly polished.

REVELATION contains no glycerine, acid, grit or a corrosive compound.

TRY IT when recommending a tooth powder in your next obstetric case.

TO GET A FULL TRIAL SIZE CAN of Revelation for test purposes, all you need to do is to write your name and address plainly in the space below and mail to us.

AUGUST E. DRUCKER CO.,
2679 California Street, San Francisco, California

Please mail me a full-size trial can of REVELATION Tooth Powder.

Name.....

Address.....

(Obstet. Jour.)

CONTENTS—Continued

- Pregnancy in the Remaining Horn of a Uterus Didelphys After Torsion and Partial Hysterectomy. By C. E. Caswell, M.D., Wichita, Kansas..... 853

Department of Maternal Welfare

- Lectures in Obstetrics to County Societies in New York State..... 851

Society Transactions

- New York Obstetrical Society, Meeting Held December 8, 1925..... 856
- Significance and Management of the Artificial Menopause. By Dr. J. A. Corserden 856
- Osteogenesis Imperfecta. By Dr. J. H. Telfair, 860
- Meeting of January 12, 1926..... 861
- Fetal Dystocia Due to a Large Cystic Tumor. By Dr. Herbert Thoms 861
- A Statistical Study of the Incidence of Labor Complicated by Contracted Pelvis in the Obstetrical Service of the Johns Hopkins Hospital. By Dr. J. Whitridge Williams..... 861

(Continued on page 8.)

The American Journal of Obstetrics and Gynecology

VOL. XI

ST. LOUIS, JANUARY, 1926

No. 1

Original Communications

THE USE OF FLUIDS IN THE TREATMENT OF HYPEREMESIS GRAVIDARUM*

BY VICTOR J. HARDING, D.Sc., AND H. B. VAN WYCK, A.B., M.B.,
TORONTO, ONT.

(From The Department of Pathological Chemistry, University of Toronto, and The Metabolism Ward, Burnside Maternity Hospital, Toronto General Hospital)

QUITE recently there have appeared in this Journal two papers^{11, 13} dealing with the treatment of pernicious vomiting of pregnancy, the one advocating, at least in certain cases, the use of sodium chloride as "specific neutralizing antitoxic protective" substance, and the other advocating the use of insulin together with glucose. The publication in so short a time of two methods of treatment apparently so different and each reporting a successful therapy, can only mean that even yet the fundamentals of treatment of pernicious vomiting are not understood. In our opinion, in both papers there is a misinterpretation of data.

In order to make clear our position, it is necessary to review briefly the steps which have led to our treatment of hyperemesis gravidarum and describe the routine procedure which has given excellent results in this hospital during the last four years.

The theory of carbohydrate deficiency or glycogen deficiency of the liver as the etiologic cause of the nausea and vomiting of pregnancy was first stated by Duncan and Harding in 1918¹ and published in extenso by Harding in 1921.² (Titus, Hoffmann and Givens³ independently published a similar theory.) It postulated either an absolute or relative lack of glycogen reserve in the maternal liver. It

*We wish to thank the Medical Research Committee of the University of Toronto for a grant which has made this work possible; also, Mrs. K. D. Allin for the analyses given in this paper.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

allowed a correlation of the fatty degenerated liver found at autopsy in this condition with physiologic fatty infiltration due to hunger, as noted by Mottram,⁴ and thus brought in the factor of starvation as one, if not the main, contributory cause of the clinical entity. It is important to note that at no time was the ketonuria, which usually accompanies pernicious vomiting of pregnancy, ever thought to be more than secondary to a lack of carbohydrate and never of itself the cause of the vomiting. Nevertheless, as both the vomiting and the ketonuria were believed to be dependent upon the common origin of lack of carbohydrate, the determination, either qualitatively or quantitatively, of acetone bodies in the urine became an indication of the clinical condition. This fact was later borne out by the work of Harding and Potter.⁵ It thus became logical to treat such cases with carbohydrate in an attempt to supply any deficiency, and a scheme of treatment was elaborated by Harding and Watson.⁶ Mild cases were treated with small meals, consisting mainly of carbohydrate, throughout the day; more severe cases, where it was impossible to supply food by mouth, were treated by the use of glucose solutions rectally, interstitially, or intravenously, as the case demanded.

From the investigation of a number of cases treated in this manner, it soon became evident that the best laboratory guide for treatment was the observation of the daily excretion of urine. Cases which responded successfully to the therapy showed, coincident with improvement in clinical condition, a greatly increased volume of urine with a lowered specific gravity. The investigation of Harding and Drew⁷ on the N.P.N. and uric acid content of blood in vomiting of pregnancy led to the conclusion that the raised values, often found in these patients, were due to dehydration; for, consequent on the production of diuresis, the high values for these substances became normal. The value of this particular piece of evidence has become somewhat weakened by the later discoveries of Harding, Allin, Eagles, and Van Wyck;⁸ but further evidence that dehydration plays a marked part in pernicious vomiting of pregnancy has been found in the behavior of the serum proteins during treatment.⁹ So important do we consider the factor of dehydration, that any patient admitted for vomiting of pregnancy to the wards of the Toronto General Hospital is at once treated, as a matter of routine, with 1000 c.c. of 5 per cent glucose solution in 1 per cent saline given intravenously each day until a diuresis is obtained. By "diuresis" is meant that the twenty-four-hour output of urine shall reach at least 1000 c.c. and shall have a specific gravity of 1010 or less. During this period of treatment the patient is isolated from the remainder of the ward and no visitors allowed. At the same time rectal enemata of 200 c.c. of 10 per cent glucose in normal saline are given three times daily and at bedtime 30 to 60 grains of sodium bromide are given in each enema for

the first day or so. No attempt is made to feed solids by mouth, but fluids are urged even if the patient is vomiting freely, and she is encouraged and allowed to drink any liquid she may fancy except tea, coffee, milk, or cocoa. This treatment usually results, within three or four days, in such marked improvement that the patient is able to take food. It is not continued for a period longer than six days without clinical improvement. In the event of failure under these conditions therapeutic abortion is performed. The treatment may thus briefly be described as rest in bed with isolation, and the forcing of fluids by all routes. The use of glucose, though important, thus has become secondary to the use of fluids in treating a severe case of pernicious vomiting of pregnancy. The later improvements in treatment were described by Harding.¹⁰

The first paper referred to is that of Haden and Guffey,¹¹ who came across a case of pernicious vomiting of pregnancy in which an examination of the blood revealed a slightly raised N.P.N., urea N and uric acid, but more significant, according to their own interpretation, a lowered chloride content and a raised CO₂ combining power. Led by the studies of the chemistry of high intestinal obstruction made by Haden and Orr,¹² these authors postulated an analogous condition of "toxemia" and treated their case accordingly. Their patient was admitted May 10, suffering from severe vomiting of pregnancy. On May 11 and 12 they gave 1500 and 500 c.c. respectively of 3 per cent sodium chloride subcutaneously; on May 13, 400 c.c. of normal saline. The amount of fluid given on May 13 and 14 was not recorded, but 1 gram of sodium chloride was given on each day. The patient continued vomiting until May 14, when, according to the report, there was a striking response to the therapy. The blood findings dated May 13 showed normal figures, although perhaps the chlorides might be considered as still slightly low. The urine volumes of May 10, 11, and 12 were not noted. Presumably the amount was small, and we, ourselves, know how difficult it is to obtain complete twenty-four-hour specimens of urine from such patients. For absolute accuracy it demands a special nurse and constant attention. On May 13, however, the urine volume was stated as 1180 c.c.; the specific gravity was not given, but we feel sure from the evidence before us that the urine volume on that day was very much larger and more easily collected than on the previous days, and that Haden and Guffey had reached that stage in therapy which we designate as "diuresis" and which we always find is accompanied by clinical improvement. Our interpretation of the case cited by these authors is that they successfully overcame the dehydration of the patient quite independently of the supply of sodium chloride. This assumes that the cure was not brought about by death of the fetus, an explanation Haden and Guffey are loth to accept. Our position is much strengthened by previous

observations of the chloride content of blood in pernicious vomiting of pregnancy given by Harding and Drew, a paper which Haden and Guffey entirely overlooked. There we found many times a lowered chloride content of the blood, often below threshold value, which rose to a normal figure at the time of diuresis. Our interpretation was that the lowered chloride of the blood was due to the consequent dehydration. It is true that the general case of pernicious vomiting of pregnancy does not show such a lowered content of the blood as was found by Haden and Guffey. The lowest figure observed by Harding and Drew was 330 mg. Quite recently, however, we have been able to observe another case of pernicious vomiting with a low chloride content and raised CO_2 combining power, analogous to that of Haden and Guffey, although there was no raised N.P.N. or urea.

CASE 1.—Mrs. P-I-k., age thirty years, para v; two months pregnant. She had been vomiting for six days, her eyes were sunken, her skin dry, and there was evidence of jaundice. She complained of epigastric pain; her pulse was 134, and temperature 100 to 102° F. The urine was highly colored, and of small volume. The blood showed slightly raised uric acid with the NaCl content 290 mg. and CO_2 combining power 63.1. For the first two days the patient was treated in the usual way with intravenous glucose, glucose enemata, and urging of fluids. There was an immediate clinical improvement, and on March 21, the third day of treatment, the blood chloride had risen to 412 with a CO_2 combining power of 66.4. During those two days sodium chloride had been given in the enemata and the intravenous glucose to the extent of 6.5 gm. On March 21 and 22 the treatment was continued as on the two previous days, except that the sodium chloride was excluded from the intravenous glucose and the enemata. The patient continued to improve, but the chloride content of the blood sank from 412 to 375 mg., the CO_2 combining power remaining approximately the same. By this time the patient was able to take a little milk and water and a small carbohydrate meal. Sodium chloride was now supplied with the meals to the extent of 6 gm. a day. The patient continued to improve, and on March 25 the blood chloride was 455 with a CO_2 combining power of 63.6. The patient made steady improvement, and on March 27 the sodium chloride was 511 mg. and the CO_2 combining power had dropped sharply to 48. The case, therefore, is similar to that observed by Haden and Guffey and was treated successfully without the use of hypertonic saline, and the chloride content of the blood rose or fell in accordance with the intake of salt. The CO_2 combining power did not drop until the chloride of the blood was well above the threshold value. Small amounts of chloride appeared in the urine on March 23, 24, 25, and 26, indicating a lowered threshold, but chloride equilibrium was not established until March 27 at a time when the CO_2 combining power had fallen to what would be a more normal figure for the condition of pregnancy. The details of the case are shown in Table I. Whatever may be the exact significance of a lowered chloride content of the blood in vomiting of pregnancy, it certainly does not demand the use of hypertonic saline in order to restore chemical equilibrium, and the clinical condition of hyperemesis gravidarum is in no way dependent upon that particular balance of ions.

The second paper is that of Thalhimer,¹² advocating the use of insulin and glucose for the treatment of excessive vomiting of pregnancy. This paper is one of a series published by the same author, in which reports are given of ten cases of hyperemesis gravidarum with

successful results. The author's advocacy of this method of treatment would appear to depend upon two claims. The first, that in this condition we are dealing with a true acidosis brought about by the production of acetone bodies, and the second, that the use of insulin considerably shortens the time of treatment and is thus advantageous. Thalhimer's interest in the treatment of this condition was apparently stimulated by his success in the treatment of some cases of postoperative vomiting,¹⁴ where often there may occur a true acidosis with a lowered CO_2 combining power and an increased hydrogen-ion concentration. The usual case of pernicious vomiting of pregnancy, however, does not show any degree of acidosis which we should consider as significant. Judged by the CO_2 combining power of the plasma there is a slight degree of acidosis. (We are using this term in a

TABLE II

CASE	CO_2 COMBINING POWER	
	Admittance	Recovery
P-n-t	—	48.5
H-l	39.5	54.8
D-l-r	48.4	
N-k	—	49.0
P-l-k	63.1	50.9
H-y	42.6	53.9
D-l-g	—	57.4
M-r-s	40.6	—
R-b-n	51.3	50.3

very general way; the finding of a low CO_2 combining power of plasma does not necessarily indicate a true acidosis.) Losee and Van Slyke,¹⁵ examining a series of cases of pernicious vomiting of pregnancy, found only a slight diminution of the CO_2 combining power when compared with normal pregnancy, and it must be remembered that a normal pregnancy even in its early stages shows a lowering of that figure. Thalhimer is aware of this for he makes reference to some work of Williamson,¹⁶ yet apparently he ignores the conclusion to be drawn, for he states "the figure for a normal alkali reserve being 60." The CO_2 combining powers found in cases of pernicious vomiting should be compared with a figure of 50 instead of 60. Harding and Potter in their series of cases of pernicious vomiting were able to find only one case in which the alveoli CO_2 tension was significantly low (Case C-k).

In Table II will be found the CO_2 combining powers of some recent cases under observation in the Toronto General Hospital before, and after treatment. It will be seen that, compared with the value for a normal pregnancy, the CO_2 combining power of the plasma is not significantly low. Moreover, Harding and Potter showed that although large amounts of ketone bodies might be produced, the concentration of these substances in the blood did not rise to the high level com-

TABLE I
SHOWING DETAILS OF TREATMENT, URINE, AND BLOOD ANALYSES IN CASE P-L-K

DATE	MEDICATION OR DIET	INTAKE			CLINICAL CONDITION	URINE					BLOOD				
		CARB.	SALT	WATER		24 HR. VOL.	SP. GR.	AGE- TONE	NaCl	NOTES	N.P.N.	UREA N	NaCl	SERUM PROTEIN	CO ₂ COMBINING POWER
Mar. 19	1000 c.c. 5% glucose in- travenous Nutrient enemata of 10% glu- cose in sa- line	gm. 68	gm. 4.5	c.c. -	Tongue coated and dry, with sordes. Face drawn and anxious. Skin dry. Slight jaun- dice and epigas- tric tenderness. Anorexia; com- plaining of severe thirst. Pulse 134; temp. 100°-102°; resp. 24.	c.c. -	1026	++	gm. nil	Bile ++ Albumin neg. Sugar neg.	mg. per 100 c.c. whole blood 29.9	14.5	290	per cent -	vol. per cent 63.1
Mar. 20	Same as Mar. 19 + weak tea with sugar	156	6.5	2970	Patient resting more comfortably. Beginning to re- tain some fluids by mouth. Vomit- ing infrequently. Pulse 120; temp. 99.2°; resp. 22.	140	1020	+	nil	“ “					

Mar. 21	Same as Mar. 20 but no NaCl	140	0	2880	General condition much improved. Skin moist. Pulse 120; temp. 99.4°; resp. 22.	1100	1009	-	nil	"	"	30	9.8	412	6.18	66.4
Mar. 22	Same as Mar. 21	135	0	2800	Further improvement. Pulse 124; temp. 99.4°; resp. 22.	1460	1008	-	nil	"	"					
Mar. 23	Ememata discontinued. Milk and water and small carb. meals	-	2	2420	Retaining meals with only occasional vomiting. Feeling much better and stronger. Pulse 120; temp. 98.2°; resp. 22.	1110	1010	-	1.22	"	"	24.6	10.1	375	7.53	64.8
Mar. 24	Intravenous discontinued. Meals as before and broth	-	6	2480	Still improving with no further vomiting.	780	1012	-	1.63	Bile +						
Mar. 25		-	6	2820		1140	1012	-	1.84	Bile trace		31.0	8.7	455	6.81	63.6
Mar. 26	Light meals	-	6	2730		850	1010	-	1.70	Bile						
Mar. 27	Light meals	-	6	2180		1780	1009	-	5.34	Bile absent		21.0	9.5	511	6.29	48.2

parable with that found in diabetes, and showed evidence of uncompensated acidosis.

The vomiting of pregnancy is thus usually not characterized by acidosis, although there is always a ketonuria arising, undoubtedly in part, from the starvation accompanying the condition. Without considering whether an uncompensated acidosis per se can produce the symptom of vomiting, there is no doubt that a simple ketonuria does not give rise to this effect. In a recent publication Harding, Allin, Eagles, and Van Wyck⁸ described the action of high fat ketonuria-producing diets in pregnancy. These diets produced no symptoms of nausea or vomiting, although in some cases the ketonuria was marked. Moreover, we have given these same high fat diets to one or two patients who had just recovered from pernicious vomiting, under the treatment described, without reproducing the symptoms.

The use of insulin in order to abolish ketonuria is thus clearly unnecessary. Its use in skillful hands may be harmless, but we do not believe it to be a valuable adjuvant to treatment. While this is true, we should not like, however, to deny that there may be an occasional case of vomiting of pregnancy in which the production of acetone bodies becomes so great, or their elimination becomes so impaired that a condition of true uncompensated acidosis may occur and the patient pass into coma. Here the use of insulin would be clinically justified. We should clearly recognize, however, that the insulin is used to combat the coma or impending coma, and not pernicious vomiting of pregnancy per se. The level of CO_2 combining power is, however, no index of the severity of the clinical condition. Thus, our most serious cases were undoubtedly D-1-r and P-1-k where the values were 48.4 and 63.1. It would be justified also were we able to prove in this class of patient an inability to utilize carbohydrate based upon a lack of insulin. Such an inability is very improbable. It is impossible, of course, to utilize the glucose tolerance test in this connection, but we ourselves, and Titus and Givens,¹⁷ have determined blood sugars, only to find normal figures. The utilization of glucose given intravenously is normal. Such an injection should, of course, be given slowly, and Thalhimer's remarks and directions on this point are excellent. Most physicians are afraid to give daily intravenous glucose solutions, yet their use is attended with no untoward results, provided proper care is taken in the sterilization of the solutions, and the temperature and rate of administration are carefully controlled. Although we have thus stated our belief that glucose is utilized by this class of patient, we do, however, think the effect of continued dehydration upon glucose tolerance worthy of further investigation.

The second claim of Thalhimer's for the use of insulin would appear to rest on a comparison of his own results with those given by Harding and Potter. The cases cited by Harding and Potter were those in-

vestigated early in the history of this work, and where an intravenous or an interstitial glucose solution was only given occasionally. Even so, a study of the protocols reveals that the majority of cases were able to tolerate light carbohydrate meals on the third or fourth day. As stated in the forepart of this paper we then became impressed with the importance of dehydration, even when, from a clinical viewpoint, it did not appear to be very great. We have examined our more recent records and find that in uncomplicated cases the patients are able to take small meals in from three to six days. The average for fourteen cases is 4.1 days from admittance to cessation of vomiting and the taking of food.

A study of the cases cited by Thalhimer shows that he has carried out a very similar form of treatment, plus the use of insulin. By use of intravenously given fluids Thalhimer has overcome the dehydration of his patients and brought about the improvement in their condition.

CONCLUSION

The successful treatment of hyperemesis gravidarum depends upon the use of fluids.

REFERENCES

- ¹Duncan, J. W., and Harding, V. J.: *Can. Med. Assn. Jour.*, 1918, vii, 1057.
- ²Harding, V. J.: *Lancet*, London, 1921, ii, 327.
- ³Titus, P., Hoffman, G. L., and Givens, M. H.: *Jour. Am. Med. Assn.*, 1920, lxxiv, 777.
- ⁴Mottram, V.: *Jour. Physiol.*, 1909, xxxviii, 281.
- ⁵Harding, V. J., and Potter C. T.: *Brit. Jour. Exper. Path.*, 1923, iv, 105.
- ⁶Harding, V. J., and Watson, B. P.: *Lancet*, London, 1922, ii, 649.
- ⁷Harding, V. J., and Drew, K.: *Jour. Obst. and Gynec.*, *Brit. Emp.*, 1923, xxx, 507.
- ⁸Harding, V. J., Allin, K. D., Eagles, B. A., and Van Wyck, H. B.: *Jour. Biol. Chem.*, 1925, lxxiii, 37.
- ⁹Unpublished observations.
- ¹⁰Harding, V. J.: *Can. Pract.*, 1924, xlix, 200.
- ¹¹Haden, R. L., and Guffey, D. C.: *AM. JOUR. OBST. AND GYNEC.*, 1924, viii, 486.
- ¹²Haden, R. L., and Orr, T. G.: *Jour. Exper. Med.*, 1923, xxxvii, 365, 367; *ibid.* 1923, xxxviii, 55; *Surg., Gynec. and Obst.*, 1923, xxxvii, 465.
- ¹³Thalhimer, W.: *AM. JOUR. OBST. AND GYNEC.*, 1925, ix, 673.
- ¹⁴Thalhimer, W.: *Jour. Am. Med. Assn.*, 1923, lxxxi, 323.
- ¹⁵Losee, J. R., and Van Slyke, D. D.: *Am. Jour. Med. Sc.*, 1917, cliii, 94.
- ¹⁶Williamson, A. C.: *AM. JOUR. OBST. AND GYNEC.*, 1923, vi, 263.
- ¹⁷Titus, P., and Givens, M. H.: *Jour. Med. Assn.*, 1922, lxxviii, 92.

REPORT OF A CASE OF ECTOPIA VISCERUM, RACHISCHISIS,
MALFORMATION OF THE SACRUM, PELVIS INVERSA,
HYPOPLASIA OF THE THORACIC DUCT, AGENESIS
OR HYPOPLASIA OF VARIOUS ABDOMINAL
VISCERA AND PLACENTA PREVIA

BY RALPH G. MILLS, M.D., AND BERNARD E. WALPERT, M.D.,
CHICAGO, ILL.

(From the Department of Pathology, University of Chicago, Chicago, Illinois.)

THE case here reported appears to be unique in its combination of abnormalities; search through the literature fails to reveal a similar instance. Some are more extensive, others combine different sets of anomalies, but the exact counterpart was not found.

The parental history contains nothing that appears to have any bearing upon the cause of this abnormality, the details are given, however, for the sake of completeness.

Clinical History.—T. G. B., housewife, age twenty-seven, Polish. She has been healthy all her life; had measles at the age of ten years. Worked as a housemaid when single. Menstruation began at fourteen, regular, twenty-eight-day type, without pain or discomfort. Has been a little anemic for some time past. No x-ray examinations.

Husband well and healthy. No history or evidence of syphilis or other venereal disease. Has been a rather heavy drinker of alcoholic liquors for a number of years.

Obstetrical History. Married nine years, V-para. Children normal, all living, all delivered by a midwife during easy and normal labors. Complete recovery. No miscarriages.

Present Pregnancy. Last menstrual period April 14, 1924, termination of pregnancy expected Jan. 19, 1925. Delivered Nov. 26, 1924, calculated age of child about seven months.

First months of pregnancy were passed without any untoward symptoms. Fetal movements felt at nineteen weeks. Has had some pain, occasionally quite severe, in the epigastric and hypochondriac regions on both sides, present in any position, but aggravated on lying down, greatly disturbing her sleep and rest. At about the end of the fifth month of gestation the patient fell into a shallow ditch striking her right knee and elbow against the soft ground, contusing them slightly, but the abdomen was not injured to the slightest degree.

Three weeks before delivery, while in the recumbent position and without the slightest known provocation, a hemorrhage of a serosanguineous character appeared, continuing for one day, during which time she continued with her housework. Three days later it reappeared, lasting for another day. It returned again two weeks later, or two days before delivery. Some clots were passed. It was supposed to have been associated with lifting a bucket of coal. Fetal movements were not felt after this time.

Typical labor pains began next day, and continued throughout the day. In the evening the hemorrhage increased in severity and the patient's anemia became so

noticeable that the midwife called a physician, who diagnosed a placenta previa centralis. The presenting part was of a very puzzling character. No fetal outlines could be made out.

Operation.—Manual dilatation of the cervix, and rupture of the membranes, enabled a diagnosis to be made of transverse presentation with what appeared to be



Fig. 1.—Front view of fetus showing the probable position of the arms and legs in utero. The anterior abdominal wall is short and has been reflected upward to show the position of the viscera. Note the evidences of maturity of the upper portion of the body and the abnormal shortness of the lower half.

D, right half of the diaphragm; *H*, heart; *L.L.*, left lung; *L*, liver; *C*, colon; *St*, stomach; *Sm. I.*, small intestine; *P*, placenta; *Memb.*, amniotic membranes; *Sp.*, spleen.

the fetal abdomen at the parturient canal. Podalic version was performed, and attempts made to bring down a leg in the usual manner by hooking two fingers in the hip of the fetus. No leverage could be secured and had to be abandoned as the fetal legs seemed to be firmly set in complete abduction. There seemed to be no hope of placing them in the reversed position. By diverse and painstaking maneu

vering, success was finally attained by bringing down first the left and then the right leg, followed immediately by the body as far as the shoulders, the delivery of which plainly revealed the abnormal character of the fetus, since practically all its viscera were outside the abdomen and wrapped up with the placenta. Similar difficulties were encountered in the delivery of the arms, since they too, were found to be firmly fixed in abduction. The after-coming head was delivered with comparative ease. The child was dead, but not macerated. The amount of liquor amnii was scanty.

Postpartum notes.—The hemorrhage ceased immediately and there was no abnormal amount of lochia. No postoperative rise in temperature. The patient re-

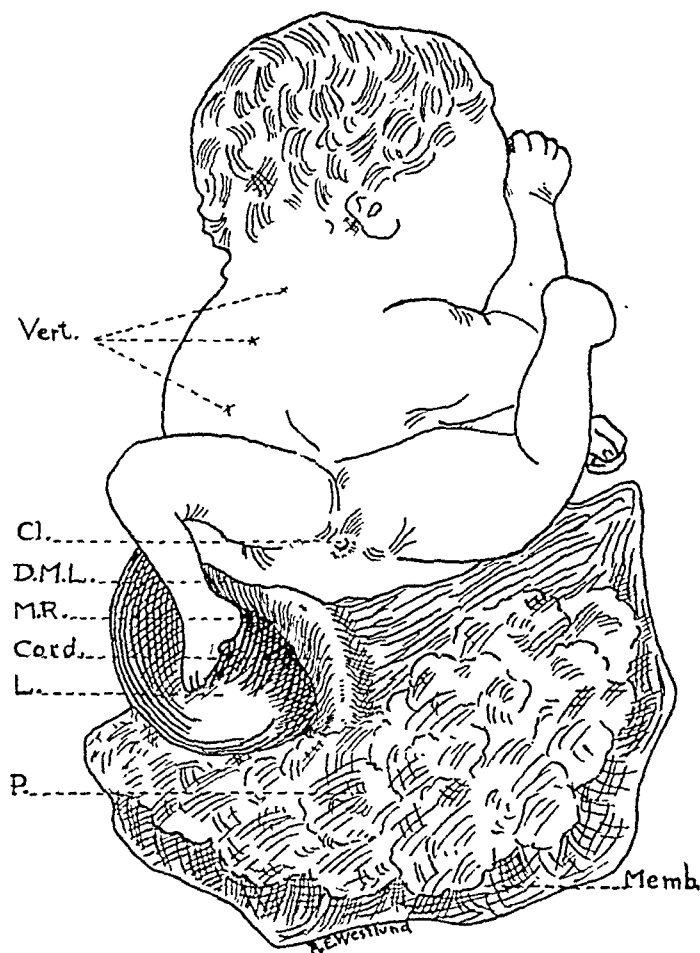


Fig. 2.—Back view of fetus. Note the straightness of the vertebral column and the relation it bears to the cloaca. *Vert.*, vertebral column; *D. M. L.*, demarcation line between the normal skin and the membrana reuniens; *M.R.*, membrana reuniens; *L.*, liver; *P.*, placenta; *Cl.*, cloaca; *Cord.*, umbilical cord; *Memb.*, amniotic membranes.

mained in bed for nine days and made an uneventful recovery except for a little bleeding for a period of about six weeks.

The clinical notes and personal history had to be obtained from the patient after delivery, as the physician was called only two hours before the birth of the child and had no previous opportunity to examine the patient. There is no evidence of any examinations by the midwife.

AUTOPSY PROTOCOL

GROSS DESCRIPTION

External Appearance.—The body is that of a fetus, which in the upper half of the trunk appears to be well formed and fully matured. It measures 37 cm. in

length, from the top of the head to the tip of the toe of the right leg, the one which is capable of being extended to the greatest degree. The weight, excluding that of the placenta, is 2,000 gm.

Evidences of maturity.—The skin is smooth and shiny, and lanugo is everywhere present. The head and shoulders are covered with the usual amount of vernix caseosa. The cartilages of the nose and ears are well developed. The nails of the fingers project well beyond the tips of the fingers, while those of the toes are slightly shorter. The cranial bones are well ossified and are in contact at the sutures. The occipitofrontal circumference of the head is 33 cm. and that of the shoulders, exactly the same. The hair of the head measures 3 cm. in length.

Head.—The head is well formed and presents no obvious abnormalities. It is symmetrical, except for a very slight prominence of the right frontal eminence.

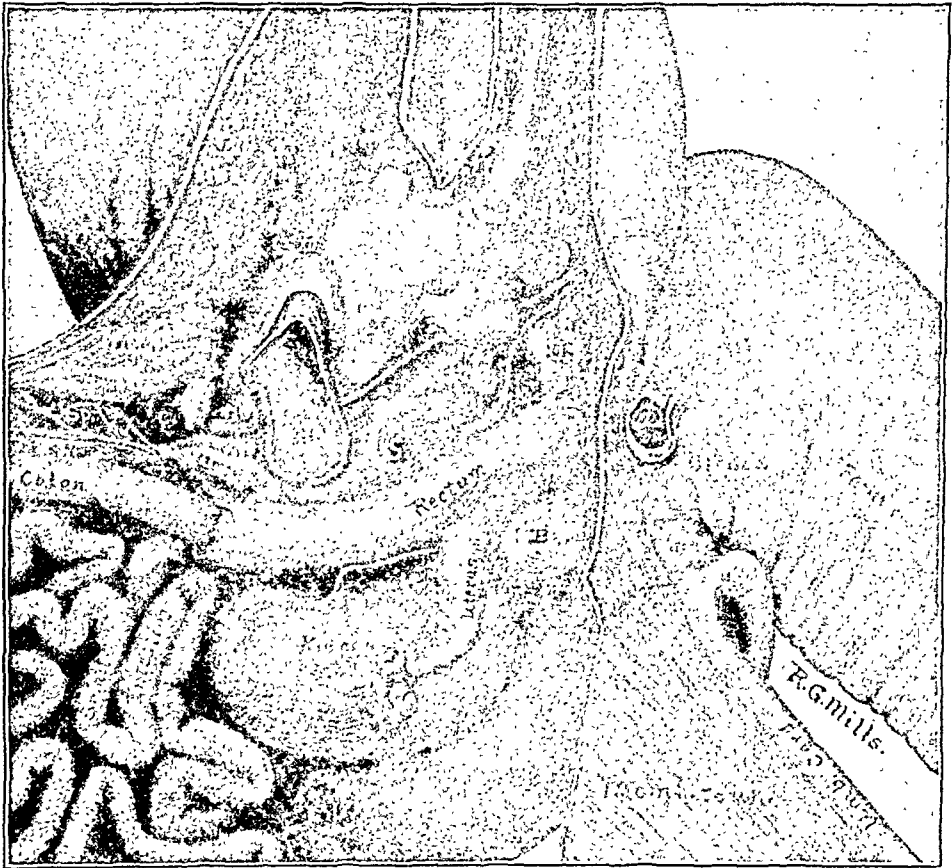


Fig. 3.—Drawing of a dissection of the structures of the back. The left leg passes upward and the right leg stretches to the right of the figure. XII, twelfth dorsal vertebra; L.V., lumbar vertebrae; S., sacrum; M., myelomeningocele; L.S.N., left sciatic nerve; R.S.N., right sciatic nerve; L.I., left ilium; R.I., right ilium (partly in outline); C., costal margin; Memb. rcun., membrana reuniens; D.M.L., demarcation line between skin and membrana reuniens; B., bladder; V., vagina; L., liver; A., adrenal; Ov., ovary; Sp., spleen.

Trunk.—The arms and shoulders are well formed and present no abnormalities. The chest is greatly compressed, the diameter, measured from the left nipple to the tip of the right scapula, being $3\frac{1}{2}$ cm., while the opposite diameter measures $7\frac{1}{2}$ cm. The free margin of the ribs extends $5\frac{1}{2}$ cm. below the nipple, and is the same on both sides. The right side of the chest extends $6\frac{1}{2}$ cm. farther forward on the right than on the left. The xiphoid process begins $\frac{1}{2}$ cm. below the nipple line and is $3\frac{1}{2}$ cm. below the episternal notch. The epigastrium protrudes, and through the thin abdominal wall may be felt a large round mass.

Posteriorly the chest conforms to the description as given above. The spinal



Fig. 4.—X-ray taken from the left posterolateral position. The curvature in the spinal column is a moderate lordosis and not a scoliosis. (cf. Figs. 1 and 3.) At the lower end, representing the lumbar vertebrae there is an obvious separation of the ossification centers which marks the site of the myelomeningocele. The indefinite mass at the right of the apparent end of the spine is the sacrum. Above and to the right of this may be seen the two femora, in relation to indefinite shadows which represent the portions of the pelvic bones. The dense shadow behind is the heart. The fracture of the left femur shows somewhat higher, where it lies above the ribs on the right side.

Below the body are the coils of small intestine on the left overlying the placenta below, which is separated into two portions (ruptured during delivery). The liver, kidney and other viscera are above the placenta. The skull shows the saw cut by which the calvarium was removed.

column is straight in the upper dorsal region, but in the lumbar portion its course cannot be definitely determined. The buttocks point backwards, a cloaca occupying a position where naturally the right hip should be. The outer convexity of the legs is in contact with the back, and touches the tips of the scapulae on either side. The left thigh lies in a groove in the back corresponding to the deformity of the chest, the right arm and right leg being in actual contact. The articulation of the femora is uncertain as to its exact relations to the pelvic bones, but there is no ankylosis. Motion is considerably limited by the skin over the sacral region, which, instead of following the axis of the spine, traverses the cord of a circle and is firmly united with that of the mid-dorsal region. There is included a considerable mass of tissue beneath the skin, between it and the spinal column beneath.

The right leg is about the usual size in the thigh and calf, but lies in an unnatural position, pointing upward until it probably lay near the face. The inner surface, which is here the outer one, is greatly flattened and the foot is bent into an extreme talipes calcaneovalgus position. The left leg is much smaller than the right, the thigh extending upward and outward until the knee rests just over the left scapula. The lower leg then turns downward parallel with the axis of the body. The calf is still smaller, the motion at the knee being greatly limited by contraction of the skin in the popliteal region. The foot is flattened and somewhat misshapen, assuming an equinovarus position. Over the left trochanteric region is a small teat-like projection of the skin which is soft and without definite form or structure. In the midline of the buttocks there is another, but smaller cutaneous appendage. These probably represent the labia.

Cloaca.—In the usual anal region is a single opening, somewhat larger than normal, and covered by a tab of skin which projects from below upwards. Drawing this aside and downwards there is exposed a bluish-colored mucous membrane lining a shallow pit. From the center of the pit there projects forward the lips of a sinus somewhat suggesting the cervix, but longer and more membranous. A probe passed through this goes to a depth of about 1 cm. The lips of the central cavity lie closed unless opened with instruments. There are two smaller openings into the cloaca, one above and one below.

Failure of abdominal walls to unite.—In the upper portion of the abdomen the skin comes to an abrupt end. Down to a definite line the skin is normal in appearance, and is well vascularized. This line of demarcation is 6 cm. below the ensiform, 3 cm. below the right margin of the ribs, $2\frac{1}{2}$ cm. below the cloaca and $\frac{1}{2}$ cm. below the left costal margin. Below the demarcation line the skin is continuous with a thin undifferentiated membrane which contains no visible blood vessels. This membrane is about 1 cm. wide in front, but posteriorly is extended to a distance of 12 cm. at the point where it is reflected onto the inner surface of the placenta.

Umbilical cord.—The cord begins at the demarcation line between the skin and the thinner membrane, about 2 cm. below the right costal margin. It continues backward following the demarcation line, and diverges from it $2\frac{1}{2}$ cm. below the cloaca. From this point to that at which it is attached to the surface of the placenta it has a length of 5 cm. It is irregular in width throughout its course, and has a wing of thin membrane attached to its opposite sides, continuing down to and onto the placenta. There is a large ragged hole through the membrane between the attachment to the cord and that portion described above, as being the longest portion. This hole appears to be of traumatic origin.

The thin membrane appears quite irregular in structure in its different portions, in some places seeming to be double. This point is not very clear in most areas.

Protrusion of abdominal contents.—As the body lies on the table, most of the abdominal viscera protrude from under the costal margin. The liver on the right side is entirely exposed, the gall bladder notch occupying the lowest position. It is attached to the lower surface of the membranous diaphragm at that point in the

dome which is adjacent to the upper side of the left lobe. The quadrate lobe is distinct, protruding through a hole in the peritoneum just above the lesser curvature of the stomach. The stomach is vertical in position, but is found in approximately the normal region. The spleen is attached to the posterior side of the stomach by a group of vessels and by its ligaments. The transverse colon lies immediately below the greater curvature of the stomach, but is reversed in direction as rotation has not taken place. Below the colon are to be seen a number of loops of small intestines. There is no omentum. When the body is turned over the organs appear in the same position as just described, except that the central area is occupied by a rounded mass lying in a sac, the upper and posterior part of which is attached to the tip of a long conical flexible body which projects downward from the region of the cloaca. Attached to the tip of this conical body is a twisted narrow tube which ends in a small fimbriated structure. Below the left costal margin is a lobulated mass resembling an adrenal and just behind it a smaller mass of uncertain nature.

DESCRIPTION OF THE ORGANS

Heart.—This organ occupies a median position in the epigastrium, the pulmonic valve lying immediately beneath the xiphoid process. It is normal in its general relations, and the anterior surface is composed largely of the left ventricle. It measures 3 x 3 cm. and is structurally normal. The foramen ovale is open. The heart is completely enveloped by the pericardium, which is normal in all respects.

Lungs.—The *right lung* is completely enveloped in the pleura which has the usual form and relations. The lower, or diaphragmatic surface, is in contact with the membranous diaphragm to be described later. The right lung is small, not expanded, and has suggestions of three lobes. The *left lung* is partly enclosed in a pleura which extends upward only as far as the fourth rib, and below its cavity is continuous with that of the peritoneum, the diaphragm in this region being absent. It is normally formed and divided into two lobes, and has not expanded.

Thymus.—This is grossly lobulated in structure, occupies the entire anterior médiastinum from the base of the heart upward, passes beneath the clavicles and reaches to the lower edge of the thyroid. It is normal in appearance and structure.

Diaphragm.—This occupies the usual position on the right side, but is membranous in structure with the exception of the ring of attachment to the body wall and a slender band which extends from the vertebra behind to its attachment to the anterior abdominal wall. The left half of the diaphragm is missing, allowing the left pleural cavity to communicate with the peritoneal cavity. Transversely across the posterior wall at the point of normal attachment of the diaphragm is a muscular ridge; this is absent on the anterior surface.

Liver.—This is a flattened globular organ, occupying the usual situation but hanging free, being attached above to the under side of the diaphragm, and presenting on its anterior face two notches, one in the upper right side for the umbilical vein which, in this instance, comes in from above instead of from below. (The umbilicus is represented by the insertion of the cord, which is just under the tip of the right costal margin.) The gall bladder notch is on the lower left and free margin. Attachment is maintained by slender adhesions to the diaphragm above and by the group of vessels in the hilum, which bring it into close relations with the stomach. On the surface are seen several subcapsular hemorrhages. The *gall bladder* is represented by a slender, ductlike structure lying in the bottom of a deep groove. Its relations appear to be normal. The liver measures 7 cm. vertically, 8 cm. horizontally and 3½ cm. anteroposteriorly.

Spleen.—This is a flattened tapering body measuring 4½ x 3 x 1 cm. It is attached by the hilum, from which emerge the normal vessels, enclosed in the fold of peritoneum representing the gastrosplenic ligament. There is no attachment to the kidney. On the surface are no moulded areas indicating pressure. The structure is

normal. There are two very small *accessory spleens* attached to the ligaments near the hilum.

Pancreas.—This organ is 3 x 1 cm. in dimensions and occupies the usual relations to the spleen and duodenum. It appears normal in every respect.

Gastrointestinal tract.—The stomach is a free-lying organ, almost vertical in position, and measures 5 cm. in length. The *esophagus* above and the small intestine below are in normal relation to it. It contains a small amount of brownish mucus. The loops of *small intestine* hang loosely and have normal mesenteric attachment. There is no Meckel's diverticulum. The *appendix* is normal. The *colon* lies in a large loop across the abdomen just below the stomach, but it has not rotated. The lower portion of the colon bends backward and upward to its end in the *cloaca*. The terminal 5 cm. of the intestinal canal is ensheathed by a muscular tube, which at the upper end, is scarcely attached to it. This represents the muscular walls of the *rectum* which have grown upward and have ended abruptly in the form of a sleeve. The lower bowel contains a small amount of meconium. The *anus* is patent.

Adrenal.—Only one adrenal is found and is presumably the left. This lies immediately below the muscular ridge which represents the left side of the diaphragm, and is covered with peritoneum. It measures 2½ x 2 cm. and is relatively quite large. On section it appears normal.

Kidney.—Only one kidney is present and this lies to the right of the midline behind. This organ is enclosed in a fold of peritoneum, which is a complete sac. This is believed to be the *right kidney* because of the course taken by the ureter attached. There is a band passing from the lower pole to the mesentery of the colon and the upper pole is firmly attached to the lower portion of the liver. It measures 5 x 3½ x 2 cm. The capsule is thin and strips readily. This, however, is quite firmly attached to the fold of peritoneum which surrounds it. On section the cortex and pyramids appear normal. Only one pelvis is present, and this is normally related to the calices. The *ureter* is relatively large, and contains a very slight amount of yellowish fluid. It is not quite uniform in diameter, but there are no definite dilatations. It follows a circuitous course upward, lying in contact with the right side of the uterus and opens by a patent orifice into the bladder.

Bladder.—This is a small well-formed normal appearing organ, measuring 2 cm. in both diameters. On section the mucosa is found to be in folds. Only a single ureteral orifice (right) can be demonstrated. The urethral orifice is patent and a probe passes easily into the cloaca. There is no urachus present.

Genitalia.—The *vagina* is a small normal-appearing cavity which opens into the cloaca. Its walls are thrown into folds and no abnormalities are seen. The hymen is represented by a lipped orifice in the center of the cloaca. The vagina is the basal undifferentiated portion of a conical elastic body, 1 cm. in diameter at the base and 5 cm. in length. The terminal part is the *uterus* with a simple cavity of small diameter which tapers off into a single *fallopian tube*, which is attached directly to the tip. The walls are tough and dense, cutting like fibrous tissue. There is no suggestion of a fundus. The fallopian tube is rather tortuous and very small in size. Its patency could not be determined. The irregularity of the tube makes it uncertain whether the entire mass is composed of the maldeveloped tube or whether there is also present a rudimentary ovary. The mass is terminated by a fimbriated structure. There is a structure lying just posterior to the adrenal, which is believed to be an *ovary*. This lies buried in a fold of peritoneum, and on the surface is a small cauliflower-like growth, which looks like the vesicular appendage of Morgagni. On section it has a homogeneous structure and at the base, near the point of attachment, is a circular body of unknown character.

Sex.—This is determined to be female.

Placenta.—This structure is 15x13 cm. in diameter, and has been ruptured half-way across, almost to the point of attachment of the cord. A fibrinous clot is still attached to the traumatized edges. The cotyledons appear normal and no unusual features are seen.

Neck organs.—The *thyroid* and *parathyroid* glands are normal. No abnormalities are seen.

Aorta and vessels.—The general structure and course of the aorta in its thoracic portion are normal. The branches which pass to the upper portion of the body are normal in arrangement and relations. The ductus arteriosus is patent. At the level of the diaphragm there are several small branches given off to the muscle of this structure, and a small one to the rudimentary left half of this body. The *abdominal aorta* passes directly downward giving off the usual branches in the epigastrium, except that there is no right ovarian or adrenal branch, the ones to the left organs being present. The celiac axis is very small and somewhat irregular in distribution owing to the abnormal position of the organs supplied. The right renal artery is present and passes to the only kidney found. At this point the course of the abdominal aorta is directly backward, passing close to and around the end of the spinal column, which in this region is bent abruptly backward. In this recurved portion are given off the branches to the ovary, adrenal and kidney as above mentioned. The iliacs are very small and pass to the corresponding lower extremities. The single umbilical artery is very large and a direct continuation of the aorta.

Lymphatic System.—The thoracic duct begins about 2 cm. above the diaphragm by the union of two very small vessels leading from the adjacent tissues and traverses an irregular course on the right side of the vertebral column. At about the level of the fourth dorsal vertebra it passes obliquely to the left side in the general direction of the left subclavian vein. The exact point of entrance was not determined, but the size of the vessel would indicate that there was no obstruction in its course.

Osseus system.—The chief malformations have been described above. In addition it is determined that the processes of the lumbar vertebrae are missing, leaving a hole through which protrudes a myelomeningocele. The sacrum is a malformed body, continuous with the lumbar vertebrae, but bent abruptly backward and to the right until its posterior surface is directed downward. It comes into rather close contact with the ilium of each side, but the pelvic girdle is not properly formed. The obturator foramen is lacking on both sides and the portions of the girdle would not be recognizable as such morphologically. The relation to the acetabulum has been preserved, although the upper portion of the right femur is enlarged and misshapen. The bones of the feet have been malformed incident to the unusual position of the lower extremities. There is a fracture of the middle third of the left femur, but the surrounding tissues are not infiltrated with blood.

Muscular system.—The failure of the abdominal wall to develop and the absence of the left half of the diaphragm are the most noticeable abnormalities. The muscles of the hips are much misplaced by the abnormal position assumed by the legs, and their relations to the pelvic girdle are disturbed.

Nervous system.—The brain exhibits no definite abnormalities. The upper portion of the cord is apparently normal and the branches given off in the upper portion of the body are seemingly well formed and properly distributed. In the lumbar region, immediately below the body of the last dorsal vertebra, the dorsal processes are absent, leaving a hole through which a tubular process formed of the membranes of the cord protrudes. This myelomeningocele is about 3 cm. in length and extends downward over the malformed sacrum. Within are to be seen some of the small branches forming the cauda equina spread out over its inner surface. The two sciatic nerves, however, are not involved in the sac, but pass out behind it and are seen running to the left and right legs. All the other branches are

found in the sac. The sciatic nerves, particularly the right one, are of good size and follow a course as direct as possible, considering the abnormal position of the pelvic bones.

MICROSCOPIC EXAMINATION

Examination of various tissues confirms the gross diagnosis and adds the following information.

1. Wall of the spina bifida. This is composed of numerous nerves supported by fibrous tissue such as found in the dura, and by fatty areolar tissue.

2. Portion of termination of fallopian tube continuous with the uterus. There is a small ring of mucosa arranged in folds, such as lines the fallopian tubes. In addition there is a small mass definitely separated from it which is a rudimentary ovary containing numerous follicles.

3. Small mass supposed to be an ovary. This proves to be such, and the nodule close to it of unknown nature is a portion of a fallopian tube.

4. Demarcation line between the skin and the membrana reuniens. The skin with its rudimentary glandular structures comes to an end and is continuous with a structureless membrane composed of strands of fibrous character, but not supplied with glands or blood vessels.

5. Umbilical cord. This is relatively normal in general structure, contains a large vein, one large and one small artery. The latter is normal in appearance, but is empty. There are no signs of vestigial structures. It is partly surrounded by amnion of characteristic structure and appearance.

ANATOMIC DIAGNOSIS

History of placenta previa centralis, artificial rupture of the placenta, version and extraction.

Maldevelopment of the processes of the lumbar vertebrae, with myelomeningocele. Maldevelopment and lateral displacement of the sacrum.

Upward and lateral displacement of the pelvic girdle to the right, pelvis inversa, with corresponding alterations in the relations of muscles and associated structures.

Moderate lordosis and slight scoliosis.

Hypoplasia of the thoracic duct.

Congenital absence of the anterior abdominal wall, with complete ectopia viscerum.

Congenital absence of the omentum.

Displacement of the heart downward and slightly to the right.

Absence of the left half of the diaphragm, with maldevelopment of the right half.

Absence of the left diaphragmatic pleura.

Failure of rotation of the colon.

Absence of the left kidney and right (?) adrenal.

Hypoplasia of the right (?) ovary and fallopian tube.

Persistence of the cloaca.

Compression deformity of the thorax.

Partial atrophy of the left leg.

Left talipes equinovarus.

Right talipes calcaneovalgus.

Abnormal development and shortening of the umbilical cord, with reduction in size of one umbilical artery.

Accessory spleens.

Subscapular hemorrhages in the liver.

Accidental obstetrical fracture of the left femur.

DISCUSSION

The mechanism by which anomalies might have been produced has been discussed in almost every report published in the last seventy-five years. "Maternal impressions" as an hypothesis took the place of the still more vague beliefs in the influence of "malignant spirits." During the past forty years there have been developed numerous theories by which to explain deformities on a mechanical basis. The older anatomists and obstetricians studied large series of cases and drew from them deductions as to the possible sequence of events and the influence of one upon another, thus laying the foundations for our present knowledge of embryology. Serious objections have been raised against each of these theories in turn, until the exceptions to a rule almost outnumber the cases which conform to it. Numerous writers, principally the German and French, have sought to modify the previous theories to fit the individual case which they reported. The literature has therefore become extremely complicated by this form of analytical reasoning. In fact, it seems that advancement through this form of study has almost reached its limit.

Relatively little attention has been paid to the possible influence of fluid accumulations in the body, except in the amniotic cavity, and the results of changes in osmotic pressure in the different parts of the body and at different stages in its development have been little appreciated.

Retroflexion of the spine in very young normal-appearing embryos has been occasionally observed, and was figured by His¹ as a possible normal stage in development. This has been disputed by most embryologists who consider this as purely accidental. It seems likely that it occurs during preservation of the specimen, from differences in osmotic pressure between the fixing fluid and that of the amniotic cavity before the latter has completely enveloped the embryo.

Ahlfeld² developed the idea that the belly stalk is responsible for many malformations of the fetus. Sudden increase in the amniotic fluid might draw the intestines away from the vertebral column and thus interfere with the closure of the abdominal wall. The vesicle was supposed to be a sac which, if it remains unconnected with the exterior, might fill with excretion, and becoming thin, finally burst. Its front wall would be lost and the hinder part remaining would become covered with mucous membrane, an ectopic bladder resulting.

Abt³ laid more stress upon fluid accumulations than most other writers have done. He has gathered instances of stasis, hydrops of cavities, edema of local tissues, decrease in the number of red corpuscles and anomalies of blood vessels as instances of fluid or vascular abnormalities.

Dakin⁴ reported a case of marked retroflexion of the spine in which

there was a large cyst in the abdomen. When this was perforated the spinal deformity disappeared. It seems reasonable to assume that a cyst on one side, or the greater accumulation of fluid on one side made possible by a weakening of the ventral wall, might cause a lateral bending of the spinal column to the opposite side. The presence of a large abdominal hernia on one side has been repeatedly observed, usually on the side opposite the convexity of a markedly scoliotic spine. The spinal deformity has been interpreted by some writers as a result of the eventration, and by some as its cause.

The accumulation of fluid in the cavities of the brain when the normal exit channels are closed has been shown by Dandy and Blackfan^{5, 6, 7} to produce hydrocephalus in man and in animals. The same might be true of hydrorachis leading to spina bifida, but in this instance the results would be less marked because of the yielding nature of the elements composing the spinal column. The pressure is thus relieved at an early stage and less deformity results. The general opinion of embryologists and some of the evidence from experimental embryology is opposed to this view. The number of cases of even large meningoceles without spinal deformity and without disturbances other than nervous, would indicate that hydrorachis is not an important deforming factor in most instances. A small meningocele in the presence of marked spinal abnormality may be taken to indicate the bulging of the dura through an area unprotected by its normal bony covering. Such it appears to be in the case here reported.

Hydrops of the various cavities of the trunk have been reported from time to time. Ascites is the most common of these, and its importance is usually considered in relation to dystocia. Occasionally adhesions between the viscera have been mentioned and the suggestion has been made that, in the absence of obvious infection, the cause might be the entrance of amniotic fluid through some rupture of the wall. The possible relationship between incomplete development of the thoracic duct and congenital ascites has not been discussed in any of the references consulted. It has been mentioned, however, as a possible explanation of congenital edema. (Smith and Birmingham.⁸) Fluid accumulations in the pleura and pericardium are very rare.

Cysts of unknown origin have been noted in various parts, particularly of the abdomen, and cystic distention of the different hollow organs has been frequently reported. Distended bladder from urethral obstruction, hydronephrosis, cystic kidney, cysts of the urachus, and many other varieties have been recorded. It is doubtful whether these have any influence upon degenerative changes other than those in the organs concerned.

External pressure has been stated as the cause of many malformations. An excess of fluid, as in hydramnios, has not been considered to be as important a deficiency as oligohydramnios, in which the pres-

sure of the uterine walls becomes applied to the body at an unusually early stage of development. Amniotic adhesions are often associated with this condition and have served to confuse the picture. Opinions have differed widely as to the importance of these phenomena, but the fact remains that both may be associated with the most profound alterations in structure and function. The absence of both in some of the most marked malformations tends to detract from their importance as causal factors.

External pressure is found to be greatest in cases of ectopic pregnancy, but in a series of 87 cases reported by von Winckel,⁹ in which fully 50 per cent were deformed there was not a single instance in which the spine or abdomen were particularly abnormal.

There is reason to believe, then, that the real cause of many of these most profound disturbances must reside within the fetus itself. The recent experimental work of Little, Bagg, and Naujoks,^{10, 11, 12, 13} with the x-ray on animals tends to confirm this point of view. Not only may malformed animals be produced in this way, but if they are capable of reproduction, the germ plasm may be so altered that their offspring may be deformed. There is no history, however, of the x-rays having been used on the mother of this abnormal fetus.

In the normal process of growth the metabolic changes in certain parts which accelerate growth and those which inhibit it in other portions must involve marked changes in fluid tension. Even a slight abnormal increase in such a situation as the abdominal cavity might so interfere with the union of the anterior wall that a condition similar to that here described would result. The intensity of this condition and the stage at which it occurred might explain the varying degrees of ventral defects from simple umbilical hernia to complete absence of the abdominal wall. An early appearance would prevent the closure while a later one, in the presence of a wall already well formed, would lead to a large ventral or umbilical hernia with a relatively narrow neck. Only the early appearance of increased intra-abdominal pressure would lead to malunion of the urogenital system and a diastasis of the symphysis pubis. Continued pressure would interfere with vascular and nerve supply to the organs, and would account for the anomaly of a perfectly formed organ existing beside a rudimentary one. The existence of pressure at the time an organ is being differentiated would determine its atrophy or complete disappearance.

There is very little evidence, from a careful study of the fetus, that would point to the site of such an accumulation, or that would indicate the stage of development at which it occurred. Nor is it to be supposed that this would necessarily explain all the deformities which have been observed. It is not even certain that there ever was such an accumulation of fluid, for it is unusual to find adhesions or other

structural alterations in hydropic conditions in later life. This general theory is, however, put forward as an explanation for many anomalies which are now attributed to pressure or some mechanical influence coming from the uterine walls or exerted upon the fetus from the exterior.

The following tentative explanation is offered for the developmental defects observed in this case based upon the assumption that some alteration in osmotic pressure or insufficient drainage caused a large accumulation of fluid in the abdomen some time during development. The upper half of the body, including the head, shoulder girdle, arms, and thorax with its enclosed organs are essentially normal. As development takes place from the head toward the tail end of the embryo we may assume that conditions were normal during the early weeks of development. The spine is practically straight and normally formed down to the first lumbar vertebra. Here a small myelomeningocele is found replacing the arches of all the lumbar vertebrae. The size of this cystic structure would suggest that it had little effect upon any deformity except possibly that of the vertebrae concerned. The sciatic nerves pass out under normal conditions and only the smaller branches of the cauda equina are involved in the wall of the sac. Hydrops of the spinal canal is therefore not probable.

Hydrothorax is excluded by the fact that only one pleural cavity opens into the peritoneum and this is the one so greatly compressed. The tissues between the two pleural cavities have not been abnormally thinned and there are no anomalies of the vessels in the vicinity upon which a distended pleura might press. The diaphragm has once formed and then been stretched until the right side has become very atrophic and the left side widely perforated. The presence of the large fetal liver may have partly protected the right side. In nearly every case of partial defect of the diaphragm the left side has been the one involved. Bayne-Jones¹⁴ reports an exception to this statement together with a systematic survey of the reported cases of perforation. It is assumed therefore that the defect in the diaphragm was the result of increased pressure from below rather than from that originating above.

The pericardium is completely closed and bears a normal relation to the heart. There is no evidence of any fluid accumulation within its cavity.

In the urogenital system there is no sign of hydrops of any organ. The single kidney is normal in its structure and appearance. It is nowhere cystic and not of the horseshoe type. The ureter is patent, it opens on the proper side of the bladder which is normal, with the single exception of the absence of the left ureteral opening. There is no urachus or remains of one, the urethra is patent and the urine

from the single kidney evidently found its way to the amniotic cavity unimpeded.

By exclusion, therefore, one may hypothecate an accumulation within the peritoneal cavity. The position of the remains of the diaphragm suggests that this ascites occurred relatively late, at least after the migration of that structure into its normal position. The normal condition of the upper portion of the spinal column and its abrupt bend backwards also suggests a relatively late accumulation. The absence of the vitelline duct and of a Meckel's diverticulum strongly suggest that the difficulty arose after the intestine had become separated. No trace of its remains could be found in the cord.

The ventral body wall forms at about the twenty-fifth to the thirtieth somite period, i.e., the fourth week. The yolk stalk has already formed and the gut closed off at this time. The splanchnopleure reaches the edges of the belly stalk at about the thirtieth to the thirty-fifth somite stage. The presence of a *membrana reunions* replacing a large portion of the ventral wall indicates interference with local development between the time that the gut is closed and that at which the cord is formed, hence about the sixth week.

The absence of any tributary of the thoracic duct below the diaphragm may well explain the accumulation in the abdominal cavity of a quantity of fluid normally drained away through the lymphatic channels. There was no edema of the legs, hence it may be assumed that the lymph from those regions reached and was retained within the peritoneal cavity.

The absence of any pressure surfaces on any of the organs suggests that the fluid accumulated early enough to prevent their production and that it persisted perhaps until the end of pregnancy. It could not be determined at the time of delivery that there was any fluid in the abdomen because of the placenta previa which demanded version and extraction. The abnormal condition was not suspected until the child appeared.

The absence of various organs and the rudimentary condition of others can be attributed in a general way to pressure which would either prevent their formation or cause their "anlage" to disappear. The fact that the missing organs, particularly those which are paired, are not from the same side, is not easy to understand. The absence of the corresponding branches of the abdominal aorta, as noted above, would be expected. The fundamental nature of the disturbance is, however, emphasized by the fact that the umbilical artery is single in the abdomen and is a direct continuation of the aorta. The tendency for the formation of two is shown by the branching within the cord, one of the branches being much reduced in size. Complete absence of an umbilical artery is a common finding in monsters, espe-

cially those with large abdominal defects in which the herniation is not in the midline.

Partial rotation of the lower portion of the body is sometimes observed in various types of malformations, but abrupt angulation of the spine is unusual. Not more than a half-dozen are reported in the literature cited in the bibliography. The absence of the *left* kidney, i.e., on the side away from which the pelvis rotated, might be explained on the basis of a lesion in the spinal column, whether this defect is primary or secondary. The primary (wolffian) duct should connect with the cloaca at the twenty-fifth to thirtieth somite stage (fourth week). Abnormal relations at or before this time would probably prevent this union and lead to atrophy and disappearance of the corresponding kidney and ureter.

The probable position within the uterus associated with the abnormal placentation and a short cord would suggest that a possible rotation and angulation would be increased rather than decreased by the more or less transverse position necessarily assumed by the fetus. There are very few reports of monsters similar to this which have been found in placenta previa (eleven or twelve in all), hence assistance on this point from the literature is not available.

It is not at all uncommon to find the body of very young embryos showing a more or less spiral or serpentine form, suggesting that even under supposedly normal conditions the body does not develop exactly equally. If there were a replacement of the normal ventral curvature of the spine in the tail end by a backward angulation or bending, the later development would tend to increase this deformity. The legs would grow in any direction in which there would be encountered the least resistance, and the pelvic deformity would tend to increase. Muscles would assume new and abnormal relations to bones and to each other, and bones would be molded in form to suit the posture. Clubbed feet would indicate that the extremities had reached the available limit for longitudinal growth or had suffered from some interference with their vascular supply. (The iliacs in this case were extremely small.) When the legs are folded against the ventral surface of the body the pelvis would develop in the natural way, but when bent backwards the symphysis would tend to separate and in extreme cases the rami would turn backwards with an abortive tendency to develop a pelvic cavity behind the sacrum instead of in front of it. The condition called *pelvis inversa* would be the result. If the process is still more marked and the ribs and abdominal walls also turn back, the so-called *schistosoma reflexum* is produced. This has been observed in calves on several occasions (von Fingerhuth,¹⁵ Gurlt,¹⁶ Halperin,¹⁷ Lucae¹⁸), and an incomplete case in a human fetus has been reported by Zander.¹⁹

There are very few cases on record in which the malformation is

as extensive as in the one described. Marked deformity of the spine, specially retroflexion or acute angulation, is usually, but not always, associated with extensive abdominal wall defects. The converse of this statement is not so universally observed. Even cases of complete abdominal fissure, involving the urogenital system, may have no noticeable spinal deformity and no anomaly of the pelvis other than a split symphysis pubis.

There is a very intangible factor which is recognized as being involved in development, but which is difficult to demonstrate or measure. Note was made above of the relations between the rectal wall and its muscular sheath. In the lower portion this is intimate, but farther up the two are quite separate. This suggests that the "developmental thrust" which produces the muscular sheath continued until its force had been exhausted or had been inhibited by some intercurrent condition. The edge was thus left free and unattached. The same might be said of the skin of the abdominal wall. Here it has grown forward, accompanied by its blood supply, until its force has been expended and there it came to an abrupt end, the transformation of the primitive membrane remaining incomplete. The presence of some form of internal pressure, presumably that of fluid accumulation, appears to be the most likely cause of such a condition of suspended activity of otherwise normally growing tissues.

SUMMARY

- 1) A case illustrating multiple fetal malformations is reported, with full pathologic studies, which is not duplicated in literature. The chief points of interest are as follows:
 - A. Normal apparently full-term development of the upper half of the body.
 - B. Absence of most of the anterior abdominal wall, its place being taken by a membrana reuniens.
 - C. Abrupt termination of a relatively straight and normal spinal column at the lumbosacral junction with acute angulation, and lateral displacement of the deformed sacrum.
 - D. Backward displacement and deformity of the pelvic girdle, (pelvis inversa).
 - E. Partial rotation and backward displacement of the buttocks, with extension of the legs up toward the occiput.
 - F. Absence of one of certain paired organs and the rudimentary development of others, not all on the same side of the body.
 - G. Hypoplasia of the thoracic duct.
 - H. Practically complete development of the female generative tract from one müllerian duct, the other being rudimentary and widely separated.

- I. Complete development of the urinary system except for one kidney and its ureter.
 - J. Persistent cloaca (failure of development of the uro-rectal septum).
 - K. Association of a major form of fetal anomaly with placenta previa centralis.
- 2) A theory is proposed to account for many or all of the anomalies, based upon an assumed congenital ascites due to a disturbance of fluid distribution occurring during growth, thus emphasizing a much neglected factor capable of producing extensive alterations in fetal form and function. The incomplete development of the thoracic duct is possibly a contributing factor.
 - 3) An extensive bibliography has been prepared, giving all references to similar major malformations which could be found in literature, together with a brief summary of the principal findings when not mentioned in the title, and a letter indicating the library in which each has been found.

Specimen. This monster has been placed in the museum of the Department of Pathology, University of Chicago, Chicago, Illinois.

Acknowledgments. It is with pleasure that the friendly criticism and assistance of Profs. H. G. Wells, and G. W. Bartelmez are acknowledged.

BIBLIOGRAPHY

The search through the literature has involved so much time and effort, and there are so many gross errors in the citation of authors that it has seemed wise to compile a rather voluminous bibliography for the benefit of those who may desire to correlate these anomalies with those later observed or with the results of experimental embryology involving defects comparable with them. Many titles are either incomplete or totally misleading and where these have been cited a word of explanation of the findings has been given. The defects presented by the case here reported include so many varieties that an attempt to cover them all would involve a summary of almost the whole of the literature on teratology. The following groups of malformations have, therefore, been for the most part omitted; minor abdominal defects as umbilical and ventral hernia, weakness of the abdominal wall, ectopia vesicae, simple spina bifida, minor spinal and pelvic defects, especially in surviving children, and miscellaneous visceral malformations, involving single organs or groups of structures unless these were associated with the major defects specifically discussed. At the end of the bibliography there have been mentioned a few of the more important articles referring to associated anomalies where critical discussions are given or where there is an extensive bibliography included.

As an additional aid to the later investigator the library in which each reference has been found is indicated by an initial letter, search having been made in the order given. (Chu) Harper Library, including the Biology Library, University of Chicago; (Chc), John Crerar Library, Chicago, Illinois; (Wm), Surgeon General's Library, Washington, D. C.

REFERENCES CITED IN THE TEXT

- ¹His, W.: *Anatomie menschlicher Embryonen*, Leipzig, 1880-5, (Chu). cf. (ii, 36, 37, Pl. I, Fig. 6, Pl. IX, Figs. 1, 2, 3, 6, 7, 8, 10, 11, Pl. X, Figs. 1-4.) Considers spine normally curved at certain stages of development, cf. iii, p. 12, et seq. 222, et seq. p. 156, Fig. 10, p. 163, Fig. 16. In second part of book, pp. 29, 32, 42. In Atlas, iii, Fig. IX.

- ²Ahlfeld, F.: Die Missbildungen des Menschen, 1880. (Chc). Collected cases of retroflexion of spine, cf. Pl. 33, 34, 35.
- ³Abt, A.: Ein Fall von Anencephalus mit Eventration und bemerkenswerten Missbildungen der Gefäss-systems, Inaug. Diss. München., 1915, Kastner and Callway, 60 pp., 2 text figs. (Chc).
- ⁴Dakin, W. R.: Fetus, the Subject of Atresia ani vesicalis, Tr. Obst. Soc. Lond., 1890, xxxii, 368-74; 1 fig. (Chc). Extreme retroflexion, large abd. cyst.
- ⁵Dandy, W. E., and Blackfan, K. D.: Internal Hydrocephalus: An Experimental, Clinical, and Pathological Study, Am. Jour. Dis. Child., 1914, viii, 406-82; 23 figs., Bibliogr. (Chc).
- ⁶Dandy, W. E., and Blackfan, K. D.: Internal Hydrocephalus: Second Paper, Am. Jour. Dis. Child., 1917, xiv, 424-43; 6 figs. (Chc).
- ⁷Dandy, W. E.: Experimental Hydrocephalus, Ann. Surg., 1919, lxx, 129-42; 13 pl. (Chc).
- ⁸Smith, A. J., and Birmingham, A.: Absent Thoracic Duct Causing Edema of a Foetus, Jour. Anat. and Physiol., 1889, xxiii, n. s. iii, 532-6; 1 pl. (Chc).
- ⁹von Winckel, F.: Über die Missbildungen von ektopisch entwickelten Früchten und deren Ursachen, Wiesbaden, 1902, J. F. Bergmann, 9 pl. (Chc).
- ¹⁰Bagg, H. J.: The Absence of One Kidney Associated with Hereditary Abnormalities in the Descendants of X-Rayed Mice, Proc. Soc. Exper. Biol. and Med., 1924, xxi, 146-9. Abstr. 74 (2306) 135th Meeting. Dec. 19, 1923. (Chc).
- ¹¹Little, C. C., and Bagg, H. J.: The Occurrence of Two Heritable Types of Abnormality Among the Descendants of X-Rayed Mice, Am. Jour. Roentgenol., 1923, x, 975-89. (Chc).
- ¹²Bagg, H. J., and Little, C. C.: Hereditary Structural Defects in the Decendents of Mice Exposed to Roentgen-ray Irradiation, Am. Jour. Anat., 1924, xxxiii, 119-45; 3 pl. (14 figs.) chart. (Chu).
- ¹³Naujoks, H.: Frucht-schädigung durch Röntgenstrahlen, Monatsschr. f. Geburtsh. u. Gynäk., 1924, lxxviii, 40-3. (Chu).
- ¹⁴Bayne-Jones, S.: Eventration of the Diaphragm with Report of a Case of Right-Sided Eventration, Arch. Int. Med., 1916, xvii, 221-37. (Chu).
- ¹⁵von Fingerluth: Beschreibung eines seltenen missgebildeten Kalbsfoetus mit mangelnden Bauchdecken, Becken und hintern Extremitäten, Arch. Anat. u. Physiol., 1826, i, 109-11; Pl. II, Figs. 1 and 2. (Wm).
- ¹⁶Gurlt, E. F.: Lehrbuch der pathologischen Anatomie der Haus-Säugethiere, II, Berlin, 1832. Cf. pp. 137-8. Pl. VI, fig. 2. (Chc). Cites 13 cases with notes on pelvic conditions. Schistosoma reflexum in calves.
- ¹⁷Halperin, R.: Ueber die abnorme Krümmung der Wirbelsäule bei congenitaler Spaltbildung der Leibeswand, Inaug. Diss., Bern., not dated. 20 pp. 1 pl. (Wm). 2 cases of schistosoma reflexum in calves and 1 in goat.
- ¹⁸Lucas, J. C. G.: Ueber Schistosoma reflexum (Gurlt). Abhandlungen herausgegeben von der Senckenbergischen naturforschenden Gesellschaft. IV, Frankfurt a. M., 1862-3, 145-60. 1 pl. Cited by Zander, describes extreme lordosis in calf. Body walls form closed cavity with hairy lining.
- ¹⁹Zander, R.: Ueber Schistosoma reflexum des Menschen. Ein Beitrag zur Entwicklungsmechanik unter normalen und pathologischen Verhältnissen. Braunschweig, 1904. Cutting from Festschr. z. Feier, von Max Jaffé, Braunschweig, pp. 153-85. 1 pl. (Chu).

CASES OF EXTENSIVE ABDOMINAL DEFECTS, MOSTLY WITH SPINAL AND PELVIC DEFORMITY

- Ahlfeld, F.: Die Entstehung des Nabelschnurbruches und der Blasenspalte, Arch. f. Gynaek., 1877, xi, 85-109. (Chu).
- Ahlfeld, F.: Demonstration of Case of Malformation with Ectopia Vesicae, Distortion of Pelvis, Etc., before Gesellsch. f. Geburtsh., in Leipzig. Mar. 19, 1877; Arch. f. Gynaek., xi, 587-8. (Chu).
- Ahlfeld, F.: Pelvis inversa, Arch. f. Gynaek., 1877, xii, 156-9. (Chc). Refers to specimen described in last reference and gives name for first time. Few similar cases previously described.
- Ahlfeld, F.: Ueber einen Monopus mit vollständigem Mangel der äusseren Genitalien und des Afters, nebst Bemerkungen (1) zur Lehre von der Aetiologie der Sirenenbildung und (2) zur Lehre von der Thätigkeit der fötalen Niere und Harnblase, Arch. f. Gynaek., 1879, xiv, 276-94. (Chu). Discusses esp. relation between defects of pelvis, genitalia, and extremities.

- Aranow, H.: Rare Fetal Monstrosity: Entire Absence of Abdominal Parietes: Talipes Calcaneo-varus: Spina Bifida, Jour. Am. Med. Assn., 1910, liv, 1786. (Chu).
- Aschoff, L.: Ueber das Verhältniss der Leber und des Zwerchfells zu den Nabelschnur—und Bauchbrüchen, Virchow's Arch., 1896, cxliv, 511-47. (Chu). Several cases of eventration and pelvic defects.
- Atthill: Exhibition of a Monster Born in the Rotunda Lying-in Hospital, Dublin Jour. Med. Sc., 1880, lxi, 533. (Chc). Complete eventration, transverse presentation, legs deformed.
- Audebert, and Bernardbeig: Monstre coelosomien: dissection et radiographies. Bull. Soc. d'obst. et de gynec. de Par., 1923, xii, 607-9. (Wm). (Chc).
- Audebert, and Bernardbeig: Monstre coelosomien porteur d'une volumineuse tumeur sacro-coccygienne, Bull. Soc. d'obst. et de gynec. de Par., 1923, xii, 623-4. (Chc).
- Audebert, and Dieulafoy: Monstre coelosomien agénosome. Description anatomique: particularites cliniques. Compt. rend. Soc. d'obst. de gynec. et de paediat. de Par., 1908, x, 261-8; 3 figs. (Wm).
- Audebert, and Lasaigues: Evisceration totale chez un nouveau-ne, Toulouse Med., 2nd Ser., 1904, vi, 265-6. (Chu).
- Ballantyne, J. W.: A Female Fetus with Retroflexion of the Vertebral Column and Spina Bifida, Tr. Edinburgh Obst. Soc., 1892-3, xviii, 226-7. (Chc).
- Bartels, M.: Ueber die Bauchblasengenitalspalte, einem bestimmten Grad der sog. Inversion der Harnblase, Inaug. Diss., Berlin, 1867. Probably republished under same title in Arch. f. Anat., Physiol. u. wissensch. Med., 1868, 165-206. Pl. V. (Chu). Discusses pelvis, lists cases, and citations.
- Beitzke: Un cas de defect partiel congenital de la colonne vertebrale et la moelle epiniere avec fente thoraco-abdomino-pelvienne, Rev. méd. de la Suisse Rom., Geneva., 1913, xxxiii, 97-122. 1 pl. (Chc).
- Bellard, E. M. G.: Contribution a l'etude des monstres celosomiens, Inaug. Diss., Lille, 1882, 42 pp. 1 pl. No. 36, 2nd Ser. (Wm). 1 case human with spina bifida, pelvic and spinal deformity, and 1 case in sheep. Bibliogr.
- Best, E., Gruber, G. B., and Höfling, T.: Beiträge zur Frage der Bauchspaltenbildung, 1, Angeborene Bauch-Darm-Blasenspalte und Rachischisis, Virchow's Arch., 1922, cccxxvi, 146-76; 16 figs. (Chu) 3 cases. Many references.
- Bland-Sutton, J.: A foetus with Spina Bifida Occulta and some Remarkable Associated Abnormalities, Tr. Path. Soc. London, 1887-8, xxxix, 432-7. (Chu). Supernumerary half vertebrae, etc.
- Bloch, E.: Zur Kenntniss der Nabelschnurbrüche, Inaug. Diss., Berlin, 1895, 30 pp. (Wm). Eventration, spinal and pelvic deformity, rudimentary right leg. Bibliogr. 1886-93.
- Bockenheimer, P.: Zur Aetiologie der Bauch-Blasen-Genitalspalte, Arch. f. klin. Chir., 1903, lxi, 669-76. Pl. IX and X. (Chu).
- Bonnaire and Brac: Fetus atteint de malformations multiples, Bul. Soc. d'obst. et de gynec. de Par., 1909, xii, 266-70. 2 pl. (Wm). Eventration, fusion of legs, pelvic and spinal deformity.
- Brabandt, M. A.: Fall von Monopodie und Hiatus abdominis, Inaug. Diss., Leipzig. 1896. 21 pp.
- Breschet, G.: An Account of a Congenital Monstrosity, Tr. Med. Chir. Soc., 1818, ix, Pt. 2, 433-42. (Chc). Marked retroflexion, placenta forms abdominal wall, pelvic deformity.
- Breus, C.: Geburt einer Missbildung; Hernia funiculi umbilicalis, Hydrocephalus, Wien. med. Wehnschr., 1881, xxxi, No. 11, 300-2. 1 fig. (Wm). Kyphoscoliosis, placenta previa.
- Brothers, A.: A schistosoma, Arch. Pediat., N. Y., 1897, xiv, 338-41. (Chc). Reports case without autopsy, and cites other cases.
- Brown, H. M.: A Case of Complete Eventration of the Fetus in Utero Complicating Labor, Am. Jour. Obst., 1881, xiv, 551-3. (Chc). Transverse, with prolapse of viscera.
- Brown, W.: A Case of Gastroschisis, Brit. Med. Jour., 1890, i, 14. (Chu).
- Bruno, G.: (spelled Brynno in Index Medicus) Fissura abdominalis completa. Jour. Akush. i Zhensk. Boliez., St. Petersburg., 1910, xxiv, 181-94. 2 pl. (in Russian). (Wm). Photostat copy and English translation placed in (Chu). Marked retroflexion and eventration, etc.
- Bryce, T. H.: Description of a Fetus the Subject of Retroflexion of the Trunk, Ectopia Viscerum, and Spina Bifida; with a Discussion as to the Cause of these Associated Abnormalities, Jour. Anat. and Physiol., Lond., 1894-5, xxix, 552-68. 1 pl. (Chu).

- Buschan, G.: Ueber Hernia funiculi umbilicalis, Inaug. Diss., Breslau, 1887, 33 pp. 1 pl. (Wm). Bibliography to date and comparative tabulation of 93 cases.
- Candela, M.: Un cas de celosoma exencefálico, El Progreso ginec. y Ped., Valencia, 1884, i, 49-61. 3 figs. (Wm). Placenta adherent to head.
- Caterina, E.: Caso rarissimo di esomfalo embrionario con agenesie molteplici, Rassegna d'ostet. a ginec., Napoli, 1919, xxviii, 116-22. (Chc). Marked eventration with pelvic deformity.
- Chadwick, J. R.: Rare Forms of Umbilical Hernia in the Fetus, Tr. Am. Gynec. Soc., 1876, i, 364-82. (Chc). 6 cases, 5 with hernias, 6th, complete eventration, latter illustrated. Some pelvic involvement.
- Chambrelent and Laubie: Un monstre coelosomien schistosome, Bull. Soc. d'anat. et physiol. de Bordeaux., 1898, xix, 284-5. (Chu). Also in Jour. de méd. de Bordeaux, 1899, xxix, 32. (Wm). Abdominal presentation with rupture of wall during delivery.
- Chiari, H.: The Relation of the Amnion to the Origin of Human Malformations, Bull. Johns Hopkins Hosp., 1911, xxii, 35-9. (Chu). Illustrates one case of eventration.
- Cholmogoroff, S.: Ein Fall von seltener Missbildung, Ztschr. f. Geburtsh. u. Gynäk., 1891, xxii, 296-302. 4 text figs. (Chc). Ectopia viscerum, kyphosis, etc.
- Cibert and Jarricot: Un cas d'absence du pelvis et des membres inferieurs, Bull. Soc. d'obst. de Par., 1908, xi, 187-93. (Chc).
- Commandeur, Gelibert and Rhenter: Foetus celosomien, Bull. Soc. d'obst. de Par., 1910, xiii, 209-12. (Chc). Retroflexion shown in fig.
- Commiskey, L. J. J.: Fetal and Newborn Mortality, Long Island Med. Jour., 1920, xiv, 398-402. (Chc). Mentions case of placenta previa and child with abdominal defect. Greenhill, by correspondence, failed to determine nature of defect.
- Cooper, P. R.: A Case of Ectopia Viscerum, Brit. Med. Jour., 1917, ii, 687-8. (Chu). No apparent spinal defect; no figs.
- Costentino, G.: Oligoidramnios e mostruosità fetali, Arch. di ost. e ginec., 1894, i, 41-50. 2 figs. (Wm). Eventration, right leg missing.
- Coxon, H. C.: Congenital Absence of Anterior Abdominal Wall, Brit. Med. Jour., 1917, ii, 425-6. (Chu). Transverse presentation, placenta attached to abdominal viscera.
- Dakin, W. R.: A Dissection of a Foetus the Subject of Retroflexion, Ectopia Viscerum, etc., with Remarks on the Frequent Association of these Anomalies and its Cause, Tr. Obst. Soc. Lond., 1890, xxxii, 200-15. (Chc).
- Dehn, M.: Eine Missbildung mit Eventration, Monatschr. f. Geburtsk. u. Frauenkr., 1864, xxiv, 175-99. 3 figs. (Chc). Pelvic deformity and partial rotation to left.
- De Moerloose, Mlle.: Un cas intéressant de tératologie (célosomien pleurosomien) Rapport de M. P. Albrecht, Presse méd. Belge, Brux., 1884, xxxvi, 385-7. (Wm). Spinal curvature; Bibliogr.
- Dentan, P.: Description d'un foetus atteint de fissure abdominale avec hernie funiculaire, Bull. Soc. méd. de la Suisse Rom. Laussane, 1879, xiii, 158-61. 1 pl. (Wm).
- Deshusses, L. E.: Etude sur les monstres celosomiens, Lille, 1903, 152 pp. (Chu).
- Doran, A.: Dissection of the Genito-urinary Organs in a Case of Fissure of the Abdominal Walls, Jour. Anat. and Physiol., Lond., 1880-81, xv, 226-34. Pl. XIX. (Wm). Specimen in Museum of Royal College of Surgeons. Spinal and pelvic deformity.
- Drew, J.: Curious Birth, and Lusus Naturae, Med. Times and Gaz., o. s., xxxii, n. s., Sept. 8, 1855, xi, 236. (Wm). Eventration, transverse presentation, spinal deformity.
- Dujol, G., and Cattin: Monstre unitaire coelosomien, Loire méd., St. Etienne, 1923, xxxvi, 335. (Chu). Left leg missing, lateral eventration.
- Duncan, J. M., and Hurry, J. B.: On Extensions or Retroflexions of the Fetus Especially of the Trunk, During Pregnancy, Trans. Obst. Soc. Lond., 1884, xxvi, 206-25. (Chc). Eventration, retroflexion without scoliosis, 2 cases.
- Falk, E.: Ueber angeborene Wirbelsäulenkrümmungen, eine pathologisch-anatomische Studie, Jena, 1914. 26 text figs. 7 pl. G. Fischer. (Chc). cf. pp. 217-404, Pl. IV-X. 8 cases. Eventration and pelvic deformity.
- Falk, E.: Demonstration von Schizosoma reflexum, Berl. klin. Wchnschr., 1914, li, 1290. (Chu). In sireniform fetus.
- Fleishmann, F. L.: Bildungshemungen der Menschen und Thiere, Nürnberg, 1833. 410 pp. (Wm). Systematic discussion of known anomalies; rich bibliogr. to older literature. Spine, p. 224; Pelvis, p. 267; etc.

- Forsyth, C. B.: Gastroschisis, Child Born with Abdominal Cleft, Jour. Am. Med. Assn., 1908, li, 1972. (Chu).
- Fraenckel, A.: De organorum generationis deformatite rarissima, Inaug. Diss., Berlin, 1825. 18 pp. 2 figs. (Latin text) (Wm). Describes spec. No. 6021 in Anat. Mus., Berlin. Eventration, cloaca, spina bifida, club foot, one umb. artery.
- Fried, G. A.: Foetus intestinis plane nudis extra abdomen propendentibus natus, Argent., 1760. (Wm). Eventration. 67 references to similar cases.
- Friedlander, G.: Presentation of Case Before Society, Monatschr. f. Geburtsh. u. Frauenkr., 1856, vii, 243-7. 3 figs. (Chc). Also in Verhandl. d. Gesellsch., f. Geburtsh., Berlin, 1857, ix, 61-4. (Chc). Inversion of bladder, atresia ani, cloaca, hydrorrachis, pelvic deformity.
- Friedman, A.: Eine Frucht mit Spina bifida und mehrere anderen Missbildungen, Königsberg, 1897. (Chu). Abd. defect, split pelvis, etc.
- Gaedkens, B.: Ein Fall von Ectopie der Baueingeweide complicirt mit Spina bifida, Inaug. Diss., Berlin, 1880. (Chc). Angulation of spine, pelvic deformity with ant. and post. split.
- Gastelier: Sur un Foetus monstrueux, Jour. de med., chir., pharm, etc., Paris, 1773, xxxix, 27-42. (Wm). Celosome with pelvis inversa.
- Genova, A.: Di un feto gastroschisi ed altra anomalie della parete abdominale, Ann. di ostet. e ginec., Milano, 1923, xlv, 660-8. (Chc). Eventration.
- Genova, A.: Di un caso raro di mostruosità fetali multiple e placenta previa, Ann. di ostet. e ginec., Milano, 1923, xlv, 376-86. 1 pl. (Wm). Eventration, absence of left leg and half of pelvis, vascular and visceral anomalies.
- Geoffroy-Saint-Hilaire, I.: Histoire generale et particuliere des anomalies de l'organisation chez l'homme et les animaux, Paris, 1832. (Chc). Systematic classification of abdominal defects, etc.
- Geoffroy-Saint-Hilaire, I.: Philosophie Anatomique, des Monstruosities Humaines, Paris, 1822. 550 pp. (Wm). Section pp. 155-223, Description d'un monstre humain né en Octobre 1820, et etablissement a son sujet d'un nouveau genre sous le nom d'Hyperencephale. Complete eventration.
- Gerard, G.: Description d'un monstre celosomien, Jour. de l'anat. et physiol., etc., Paris, 1899, xxxv, 311-32. (Chu).
- Giles, A. E., and Probyn-Williams, R. J.: A Case of Exomphalic Foetus, Tr. Obst. Soc. Lond., 1894, xxxvi, 174-6. (Chu). Pelvis deformed.
- Gruber, G. B.: Fötale Missbildungsbecken, Arch. f. Gynäk., 1921-22, cxv, 615-23. 6 text figs. (Chc). Describes 4 pelves, 3 of them previously described by Gruber and Best, and by Best, Gruber, and Höfling.
- Gruber, G. B., and Best, E.: Beiträge zur Frage der Bauchspaltenbildung, II, Angeborene Bauchspalte, okkulte Kloake und Rachischisis bei einer sirenformigen Missbildung, Ztschr. f. urol. Chir., Berlin, 1921-22, viii, 190-203. 5 text figs. (Chu). 1 case, pelvic deformity, etc.
- Guinard, M. L.: Presentation de deux squelettes de monstres celosomiens, Mem. et compt. rend. Soc. d. Sc. méd. de Lyon., (1892) 1893, xxxii, Pt. 2, 131-5. (Wm). Also Lyon méd., 1892, lxxi, 161-5. (Chc). One case, streptosoma, eventration, pelvic deformity, one case, chelonisoma. Cites 5 previous cases.
- Hall, A.: A Case of Monstrosity, Tr. Obst. Soc. Lond., 1868, ix, 271-5. (Chc). Left leg missing, large eventration, pelvis rudimentary.
- Hallett, C. H.: Observations Illustrating the Anatomical Structure and Physiological History of Monsters with Eventration, Edinburgh Med. and Surg. Jour., 1847, lxxviii, 303-42. Pl. XII-XIV. (Wm). Describes 3 cases, eventration with spinal deformity, survey of other cases, scholarly discussion.
- Hankins, J. L.: Two Interesting Cases, an Example of Eventration, Old Dominion Jour. Med. and Surg., 1909, viii, 327-8. (Chc). Spinal deformity, etc.
- Harrison, J. B.: Case of Monstrosity, Dublin Quart. Jour., 1852, xiii, 229-31. (Chc). Hydramnion, eventration, pelvic displacement, etc.
- Hasenest, D. J. G.: Foetus monstrosi ex imaginatione deturpati, Acta physico-medica Acad. Caesareae Leopoldino-Carolinae naturae curiosorum. etc., 1742, vi, 41-4. Pl. I, Figs. 1 and 2. (Wm). Low eventration, spine twisted, legs deformed.
- Hawkins, V. J.: A Case of Malformation in a Fetus at the Eighth Month; Foetus Schistosomic; (Ectopia Viscerum) with Sympodic Lower Extremities; Placenta Adherent to Peritoneum of Foetus, Northwest Lancet, St. Paul, 1892, xii, 70-1. (Chc). Pelvis retroverted.
- Hein, R.: Beschreibung einer Missgeburt. (Fehlen der vorderen Bauchwand mit Ektopia viscerum und mangelhafter Entwicklung der Extremitäten, Virchow's Arch., 1873, lviii, 326-8. (Chu). Spinal deformity, placenta previa.

- Herholt, C.: Widernatürliche Geburt eines monströsen Kindes, Stark's Arch. f. d. Geburtsh., 1787, i, 37-47. 2 pl. (Wm). Eventration.
- Hermann, J. J.: Beschreibung zweier Missgeburten, Med.-Chir. Zeitung, Innsbruck, 1822, iv, 93-6, 110-12. (Wm). One case with anencephalus and ectopia cordis, one with ectopia viscerum, absence of right leg, spinal and pelvic deformity.
- Hertzfeld, M.: Ein Fall von Nabelschnurbruch, Inaug. Diss., Königsberg, 1892, 26 pp., 2 pl. (Wm). Describes case similar to subject of paper, Placenta previa, collects 15 cases in addition to those cited by Thorner, i.e. Some omitted here as being of minor degree.
- Heryford, W. B.: An Obstetrical Anomaly, N. Am. Pract., Chicago, 1889, i, 428-9. (Chc). Complete eventration, spina bifida, genitalia rudimentary.
- von Heusinger, C. F.: Beobachtung einer Missgeburt mit Verwachsung der Haut und des Amnions, Mangel der rechten unteren Extremität. u. s. w., Ztschr. f. organ. Physik., 1828, ii, 208-13, 3 pl. (Chu). Thin abd. wall.
- Hirigoyen, L.: Monstre celosomien, agénosome, spina-bifida, Bul. Soc. d'anat. et physiol., etc., de Bordeaux, 1884, v, 239-41. (Wm). (Cited by Root as Herigoyen) Schistosomus.
- Hirst, B. C.: A Specimen of Defective Development of the Abdominal Wall and Eventration, Cyllosoma, Presented to the Wistar Museum by I. Leopold, Med. News, Philadelphia, 1895, lxi, 213. (Chu). Left leg missing.
- Hirst, B. C., and Piersol, G. A.: Human Monstrosities, 4 parts, Lea Bros. and Co. 1893. (Wm). Total of 39 photos, 123 woodcuts. Part I, p. 62 bibliogr. and classification. Part II, Fig. 19, eventration, pelvic and spinal deformity, (From Mütter Museum. Coll. of Phys., Phila.) 3 other cases cited in this bibliogr. 2 cases first description. Part IV, p. 207 bibliogr.
- Houel, M.: Case Report. (No title.) Bull. Soc. anat. de Par., 1849, xxiv, 217-20. (Wm). Lateral eventration, body bent. Head anomalies.
- Houel, M.: Monstre celosomien du genre agénosome (Geoffroy-Saint-Hilaire) Mém. de la Soc. de Biol., 1850, ii, 107-17. (Chc). Torsion of spine, pelvic deformity, good critical discussion.
- Houel, M.: Anatomie d'un monstre humain celosomien, Mém. de la Soc. de Biol., 1851, iii, 51-2. (Chc). Pelvic deformity, spina bifida.
- Houel, M.: Mémoire sur les adherences du placenta ou des enveloppes a certaines parties du corps du fœtus, Gaz. méd. de Par., 1858, No. 3, 32-4. (Wm). Abstr. Canst. Jahrsb., 1858, iv, 6-7. (Wm). 4 cases, 1 previously described (Houel, Bull. Soc. Anat., 1849). All with some eventration and spinal deformity. In Dupuytren Mus., Nos. 154-7.
- Hubert, A.: Description d'un fœtus monstrueux du genre des agénosomes (classification d'Isidore Geoffroy-Saint-Hilaire), Jour. de méd., de chir., et de pharmacol., 1887, lxxxiv, 615-8., 2 figs. (Wm).
- Jester, K.: Eine Frucht mit Hirnbruch, Bauchbruch und amniotischen Verwachsungen, Inaug. Diss., Königsberg, 1892, 27 pp., 1 pl. (Wm). Placenta adherent to skull, eventration, torsion of spine, etc.
- Jewett, G.: Monstrosity, Brooklyn Med. Jour., 1897, xi, 132-7. (Chc). Right leg, and half of pelvis missing. R. L. Dickinson cites a similar case, not published, in museum of college.
- Joachimsthal, G.: Ektopia vesicae, combinirt mit anderen Verbildungen, Deutsch. med. Wehnschr., April 28, 1898, No. 12, p. 74-5, 1 fig. (Chu). Split symphysis.
- Johnson, D.: Report of Case of Deformed Fetus with Placenta Adherent to It, Intestines Uncovered and Presenting, with Description of Delivery, Tr. Obst. Soc. Lond., 1871, xiii, 53-4. (Chu).
- Johnston, J. A.: Extrusion of the Intestines, Lancet-Clinic, Cincinnati, n. s., 1903, li, 64. (Chc). Unpublished case mentioned by M. A. Tate.
- Jelicoeur and Colleville: Malformation, Union méd. du nord-est, Reims, 1888, No. 5, p. 99-100. (Chc). Notice of case presented to society. Spine ends abruptly at end of lumbar vert. No sacrum. Iliac rudimentary. Various other anomalies.
- Karpeles: Ein Fall von Eventration, Inaug. Diss., München., 1893, 15 pp.
- Kermauner, F.: Ueber Missbildungen mit Störungen des Körperverschluss, Arch. f. Gynäk., 1906, lxxviii, 221-66, 1 pl., 2 text figs. (Chu). 5 cases. Various abd. defects. Some with pelvic and spinal deformity. Bibliogr.
- Klautsch, A.: Zur Casuistik der Bauchspalten, Centralbl. f. allg. Path. u. path. Anat., May 31, 1895, vi, 385-94, 1 text fig. (Chu). Placenta previa circumvallata. Eventration and retroflexion.
- von Klein: Beschreibung eines seltenen missgestalteten Kindes ohne Bedeckung der Unterleibs-Eingeweide, Meckel's Deutsch. Arch. f. d. Physiol., 1817, iii, 291-5, 1 pl. (Chu). Complete eventration, left foot missing, and part of pelvis. Scoliosis.

- Knauf, G.: Ueber einen Fall von Bauch-Blasen-Genitalspalte, Inaug. Diss., München, 1904, 36 pp, 2 pl. (Wm). Split pelvis, lordosis, scoliosis.
- Koch, M.: Multiple Hemmungs- und Defektbildungen bei einem neugeborenen Kinde, Virchow's Arch., 1909, cxvii, 207, 2 figs., 3 text figs. (Chu). Externally relatively normal, pelvis much deformed, etc.
- Kocheim, W.: Zur Pathologie der Eventration und mehrerer anderen Missbildungen, Inaug. Diss., Breslau, 1914, 33 pp., 1 pl. (Wm). Pelvic and spinal deformity.
- Kriwsky, L.: Ein Fall von Bauch-blasen-schambeinspalte mit Verdrehung der unteren Extremitäten, Monatschr. f. Geburtsh. u. Gynäk., 1900, xi, 895-7, 3 figs. (Chc). Transverse presentation. Large low eventration, pelvic deformity.
- Krumrey, A. F. K.: Ein Fall von Encephalocoele, Hiatus thoracis et abdominis lateralis mit Ektopie der Eingeweide und anderen Missbildungen in Folge von amniotischen Verwachsungen, Inaug. Diss., Griefswald, 1893, 34 pp. (Wm).
- Kuppenheim: Demonstration einer Missbildung, Monatschr. f. Geburtsh. u. Gynäk., 1906, xxiv, 126-7. (Chc). Transverse presentation, absence of right leg and half of pelvis.
- Lamb, D. S.: Malformations and monstrosities in the Army Medical Museum, Mil. Surgeon, 1911, xxix, 374-400. (Chc). Describes 11 cases of abd. defect, eventration, etc.
- Lüwen, A.: Ueber einen Fall von kongenitaler Wirbel-Bauch-Blasen-Genital und Darmspalte mit Verdoppelung des Cöcums und des Wurmfortsatzes, Beitr. z. path. Anat. u. z. allg. Path., 1912-13, lv, 575-94, 1 pl., 2 text figs. (Chu). Symphysis split.
- Leavitt, F.: Case of Congenital Eventration; Fetus Born Dead at Seventh Month, Northwestern Lancet, Minneapolis, 1902, n. s., xxii, 319, 1 fig. (Chc).
- Lewis, H. F.: Gastroschisis, Surg., Gynec. and Obst., 1921, xxxiii, 193-4. (Chu). Placenta previa marginalis, retroflexion, evisceration. Another case mentioned with split symphysis, small abd. defect.
- Lichtenstein, M.: Ueber einen Fall von angeborener Bauchspalte, Inaug. Diss., München, 1913, 27 pp. (Wm). Details of 7 cases, only last of which is of special interest. Placenta previa, eventration, spinal deformity.
- Lockwood, C. B.: Retroflexion of an Early Human Embryo Associated with Absence of the Spinal Medulla and Imperfection of the Vertebral Column, Trans. Obst. Soc. Lond., 1887, xxix, 234-43, 7 figs. (Chu).
- Lowne, B. T.: Descriptive Catalogue of the Teratological Series in the Museum of the Royal College of Surgeons of England, Animal malformations, by B. T. Lowne, London, 1893. (Chu). cf. cases 324-340. Spinal curvatures, subclass 1, 2, with ectopia of the viscera. Also p. 83, subclass III, group I, and p. 86, group II. Defective development of somatopleural laminae, thoracic, abdominal and neural.
- Macmahon, J. R.: An Embryological Curiosity, Lancet, Lond., 1898, ii, 686-7. (Chu). Eventration, scoliosis, semicloaca, oligohydramnion.
- Magid, O. M.: Ectropion of Abdominal Viscera, AM. JOUR. OBST. AND GYNEC., 1921-2, ii, 446-7. 3 figs. (Chu). Retroflexion, pelvic defect, etc.
- Magnussen, P.: Beiträge zur Casuistik der Bauch-Blasen-Schambeinspalte mit Eventration, Inaug. Diss., Berlin, Mar. 1, 1886, 43 pp. (Wm). 3 cases with spinal, pelvic, and abd. wall defects.
- Manley, T. H.: Embryonic, Umbilical Hernia, Containing the Stomach, Small Intestines, the Cecum and Colon, with the Liver, Spleen, and Pancreas, in a Newborn Female Infant, Canad. Jour. Med. and Surg., Toronto, 1899, v, 295-7. (Chc).
- Martin: Eventration mit beiderseitiger Hydronephrose und Uterus didelphys nebst offener Harnblase und Dickdarm mit deutlicher Oeffnung des Dünndarm und ausgebildetem Mastdarm bei einem acht Monate alten Neugeborenen, Monatschr. f. Geburtsk. u. Frauenkr., 1864, xxiv, 161-5. Pl. 2, Fig. 2. (Chu).
- Martland, H. S.: Case of Imperfect Closure of the Ventral Abdominal Wall. Jour. Med. Soc. New Jersey, 1909-10. vi, 304-5. (Chc).
- Matzdoff, E.: Ein seltener Fall von Missbildung, Inaug. Diss., Berlin, 1887. (Chu). Retroflexion, scoliosis, marked pelvic deformity, eventration.
- Maygrier: Monstre celosomien, du genre pleurosome; atrophie du membre superieur droit. Hydrocephalie et malformations de la face. Commencement d'amputation congenitale de deux orteils. Anomalie du cordon ombilical; brides amniotiques. Hydramnion, Bull. Soc. d'obst. de Par., 1898, i, 19-28. 1 pl. (Wm).
- Mayne, R. G.: Provinc. Med. Jour., No. 177, 1844. Abstr. Schmidt's Jahrb., 1844, xliii, 50, under title "Fall von Wassersucht der Nabelschnur mit Bildungshemmung." Abdominal defect, absence of diaphragm, scoliosis, compression of thorax. (Chc).

- Mezger, G.: Beschreibung einiger Missbildungen mit Störung des Körperverschlusses, Inaug. Diss., Strassburg, 1911. 29 pp. 5 text figs. (Chu). 5 cases, all with eventration, or spinal and pelvic deformity, or both.
- Mitchell, T. H.: Presentation of Abdominal Viscera, Brit. Med. Jour., 1903, i, 196. (Chu). Eventration, atresia ani.
- Monier, A., and Roche, G.: Monstre celosomien, Bull. Soc. d'obst. et de gynec. de Par., 1913, xvi, 616-8. (Wm).
- Montault, J. -J.-H.: Accouchement laborieux; presentation du bras droit, et intestines par un foetus affecte d'eventration; version de l'enfant qui offrait plusieurs vices de conformation remarquables; prompt retablissement de la mere qui a pu reprendre ses occupations le douzieme jour apres l'accouchement, Gaz. d. hôp., 1832, vi, 293-4. (Wm).
- Montgomery, W. F.: Description of a Very Remarkable Malformation in a Foetus, in Which Nearly All the Abdominal Viscera and the Intestinal Canal Were External to the Body, Dublin Med. Trans., 1830, n.s., i, 375-83. 1 fig., (Chc). Pelvis and spine distorted.
- Montgomery, W. F.: Case in Which the Whole of One Lower Extremity and the Side of the Pelvis Were Deficient at Birth, Owing to Cohesion of the Placenta with the Body of the Child, Dublin Jour. Med. Sc., 1855, xxi, 257-64, 1 fig. (Chc). Describes 2 cases conforming to title.
- Montgomery, W. F.: Same title as preceding. Dublin Quart. Jour. Med. Sc., 1856, xxii, 68-73, 2 fig. (Chc).
- Murillo, A.: Los celosomianos; un schistosomo. Rev. méd. de Chile, Sant. de Chile, 1892, xx, 49-57, 2 pl. (Wm).
- Myschkin, M. M.: Zur Lehre von der Zwillingschwangerschaft und von der Entstehung der angeborenen Missbildungen, Part II, Monstrum humanum kyphoscolioticum cum spina bifida consecutivisque abdominis hiatu completo et genitalium extremitatumque, Virchow's Arch., 1887, cviii, 133-64, 3 fig. (Chu). Also in Trudi Obsh. Russk. Vrach, v, S. Petersburg, (1885-6) 1888, liii, 56-61. (Wm). Under longer Latin title giving further details. Bending of upper part of spine and absence of lower portion. No legs or pelvis, abd. wall missing.
- Napier, L.: Foetus at Seven Months Illustrating Celosoma with Retroflexion, Meningocele, and Talipes Varus, Tr. Obst. Soc. Lond., 1894, xxxvi, 116, and 302-6. (Chc). Latter reference is report of committee appointed to study case.
- Nubiola, P.: Mónstro autósito celosomiano, Arch. de ginecop., Barcel., 1911, xxiv, 67-70. (Wm).
- Oehler; Eine seltene Missbildung im Abdominalbereich, Charité-Ann., Berlin, 1909, xxxiii, 433-9. (Chc). Lateral eventration.
- O'Farrell, M. Z.: Niña nacida con eventración de los organos abdominalis, Semana méd., Buenos Aires, 1903, x, 815-6, 1 fig. (Chc). Eventration, no mention made of spine or pelvis.
- Opitz: Demonstration of Case Before Society, Centralbl. f. Gynäk. 1899, xxiii, No. 19, 572. (Chc). Placenta attached directly to body, split bladder and pelvis, legs in abnormal positions.
- Orihuela, R. M.: Curioso ejemplar de un monstruo teratosomo a tipo celosomiano con espina bifida, Rev. de med. y ciruj. de la Habana, 1918, xxiii, 559-62. (Chc). Eventration, no mention of any pelvic deformity and not shown in 2 figs.
- des Ormeaux, V.: Enfant monstre celosomien aspalosome, Gaz. med. de Nantes, 2 s., 1913, xxxi, 272-5. (Chu). Complete eventration, etc.
- Otte, A.: Über Spaltungsmisbildungen am Unteren Körperende, Gynäk. Rundschau, 1907, i, 105-11, 2 figs. (Chc). Scoliosis, split symphysis, eventration.
- Otto, A. G.: Monstrorum sexcentorum descriptio anatomica, Vratislaviae, 1841, 335 pp., 30 pl., Latin text. (Chu). Cases of eventration figured in Pl. IX, 3, XI, 1 and 2, XII, 1 and 2.
- Parson, E.: A Case of Twin Pregnancy Occurring Two Years After Ovariectomy; Attended with Abnormal Development of One of the Children, Lancet, London, Mar. 17, 1866, i, 284-5, 2 figs. (Chc). Eventration, retroflexion, spina bifida, etc.
- Petit: Description d'un foetus difforme, Mém. Acad. roy. d. sc., Par., 1716, p. 82. (Wm). (not seen) Citation in Monatsschr. f. Geburtsk. u. Frauenkr., 1865, xvi, 255-7. (Chc). Pelvis inversa, ectopia vesicae.
- Philippeaux, J. M.: Note sur un foetus monstreux a eventration complete, du sexe féminin, Gaz. méd. de Par., 4th ser., Mar. 15, 1873, ii, No. 11, 146. (Chc). Placenta adherent to abdomen, scoliosis, spina bifida, atrophic right leg, etc.

- Pollack, M.: Kombination von Spina bifida, Kloakenmissbildung und Eventration an einer und derselben Frucht, Inaug. Diss., München, 1914, 28 pp., 1 fig. (Chu). Retroflexion.
- Ramsay, S.: Communication, Northwest Med. and Surg. Jour., 1857, n.s., vi, 449-50. (Wm). Entire abd. wall missing.
- Raybaud, and Bruneau: Note d'autopsie sur un monstre celosomien, Marseille méd., 1902, xxxix, 438-9. (Wm).
- von Recklinghausen, F.: Untersuchungen über die Spina bifida, Virchow's Arch., 1886, cv, 243-330, and 373-455, 1 text fig., 2 pl. (Chu). Many cases of spina bifida with more or less abd. defect. Case 32 with eventration. Several with scoliosis, lordosis, etc.
- Reil: Merkwürdige Missbildung, Illustr. med. Zeitung, 1853, iii, 83-92, 4 figs. (Chc). Eventration, left arm attached in groin, scoliosis.
- Remfrey, L.: Remarks on Fetal Retroflexion: Report of a Specimen Showing Origin of Gluteus Maximus from Occipital Bone, Tr. Obst. Soc. Lond., 1894, xxxvi, 227-37. (Chc). Figures. Bending in cervical region.
- Rischpler, A.: Über drei Fälle von Eventration, Inaug. Diss., Marburg, 1898, 43 pp., 1 pl., 2 figs. (Wm). Also in Arch. f. Entwicklgs. mechn. d. Organ., 1898, vi, 556-96, 1 pl. (Chu). Spinal curvature, vascular anomalies.
- Roe, C. D.: A Remarkable Case, Lancet, London, 1889, i, 324-5. (Chc). Complete eventration, diaphragm absent, atresia ani, scoliosis.
- Root, E. H.: Celosomus, Variety, Schistosomes, Recovery, Tr. Chicago Path. Soc., (1894-5) 1896, i, 247-52. (Chu).
- Rose, E.: Ueber das Offenbleiben der Blasen, Monatsehr. f. Geburtsk. u. Frauenkr., 1865, xxvi, 244-72, 3 figs. (Chc). Pelvis deformed.
- Rosenhaupt, H.: Eine seltene Missbildung, Bauchblasenschambeinspalte mit Beteiligung des Darmes, Verlagerung einer Niere, Fehlen der rechten Nabelarterie und Uterus separatus duplex, Arch. f. Kinderh., 1905, xli, 361-9. (Chu). Split symphysis.
- Routh, A.: Foetus with Hernia Umbilicalis Congentia, and Spina Bifida Lumbo-sacralis, Tr. Obst. Soc. Lond., 1893, xxxv, 102-6, (Chc). Report of committee appointed to examine specimen, shown to society in previous year (ibid., 1892, xxxiv, 463). Ectopia viscerum, retroflexion, pelvic deformity, etc.
- Russo, V.: Di un feto mostruoso con fessura abdominale ed ernia di tutto il pacchetto intestinale, Arte ostet.; Milano, 1916, xxv, 241-5. (Chu). Eventration, no mention of pelvic deformity.
- Sachs, W.: Ueber einen Fall von Eventration, Inaug. Diss., Marburg, 1877, 14 pp., 1 pl. (Wm). Marked scoliosis, rotation of body $\frac{3}{4}$ of turn.
- Sacré, J.: Description d'un monstre agenosome, Ann. de la Soc. anat-path. de Brux., 1861, iv, 28-31. (Wm).
- Schaefer, P.: Descriptio anatomico-pathologica monstri cum eventratione, Inaug. Diss., Bonnæ, 1837, 22 pp., 2 pl. (Wm). Absence of right leg and half of pelvis. Bibliogr.
- Schaller: Multiple Missbildung mit totalen Defekt der Nabelschnur, Med. Cor.-Bl. d. württemb. ärztl. Landesver., Stuttg., 1906, lxxvi, 953-5. (Chu). Torsion of body, no cord, arms absent or rudimentary, etc.
- Schenck, S. B.: A Case of Gastroschisis, Perforate Diaphragm, Anorchidy, Cloaca, Absence of Colon and Rectum, Imperforate Anus, Spina Bifida, Spinal Scoliosis, Sacral Lordosis, and Split Pelvis, Am. Jour. Obst., 1919, lxxx, 38-46. (Chc).
- Schmidt, C. G.: A Case of Total Eventration, New York Med. Jour., 1900, lxxii, 710-11. (Chc). Hips and spine normal.
- Schwenke, J.: Ueber drei Fälle von Bauchspalte mit verschiedenen Komplikationen, Beitr. z. path. Anat. u. z. allg. Path., 1912, lii, 445-75, 1 pl., 2 text figs. (Chu). Eventration with scoliosis, etc.
- Sheehy, W. H.: Fetal Malformation, Brit. Med. Jour., Feb. 27, 1875, i, 275, 1 fig. (Chu). Complete eventration, pelvic deformity, visceral anomalies.
- Simons, F. A.: Eventration in Kombination mit verschiedenen anderen Missbildungen, Gynäk. Rundschau, 1914, viii, 354-60. (Chc). Right leg missing, scoliosis, spina bifida, pelvic deformity.
- Simpson, A. R.: Dystocia from Exomphalos of the Foetus, Edinburgh Med. Jour., 1881-2, xxvii, 873-8, 1 fig. (Chc). Complete eventration, retroflexion, refers to 14 cases of retroflexion.
- Sömmering, S. T.: Abbildungen und Beschreibungen einiger Missgeburten, Mainz, 1791. (Chc). Figures case in Pl. VIII, scoliosis, ventral hernia. Also Pl. X, Fig. 3, large umbilical hernia with cord on side.
- Stern, H.: Eine Frucht mit Eventration und mehreren anderen Missbildungen, Inaug. Diss., Königsberg, 1896, 17 pp., 1 pl. (Wm). Left leg rudimentary.

- Sternberg, C.: Fissura abdominis vesico-intestinalis mit vollständiger Umkehrung des Beckens. (Pelvis inversa), Verhandl. d. Gesellsch. deutsch. Naturf. u. Aertze, 2, Pt. 13, 82nd meeting, Sept. 20, 1911, pp. 13-14. 1st Div. Section on Gen. Path. and Path. Anat. (Chc). Reports same case as in following reference.
- Sternberg, C.: Title as above. Centralbl. f. allg. Path. u. path. Anat., Feb. 15, 1911, xxii, No. 3, 101-6, 2 figs. (Chu).
- Strassmann, P.: Missbildung mit grossem Bauchbruch. Fehlen der Nabelschnur. Prolaps der Placenta, Ztschr. f. Geburtsh. u. Gynäk., 1895, xxxi, 178-80, Pl. VII-IX. (Chc). Placenta previa centralis, hyperlordosis, eventration.
- Struve, P. F. W.: Eine Frucht mit Eventration und mehreren anderen Missbildungen, Inaug. Diss., Königsberg, 1897, 1 fig. (Chu). Lordosis, scoliosis.
- Stute: Fall von Placenta praevia mit totalem Fehlen der Nabelschnur, Monatschr. f. Geburtsk. u. Frauenkr., 1856, vii, No. 1, 36-8. (Wm). Complete eventration, placenta attached to abd. wall, spina bifida.
- Taglicht, F.: Ein Fall von zahlreichen Missbildungen bei einer totgeborenen Frucht, Virchow's Arch., 1920, cccxix, 303-36, 1 fig. (Chu). Scoliosis, pelvic deformity, eventration.
- Tänzer: Case Report (no title), Ztschr. f. Geburtsh. u. Gynäk., xiv, 249. Reported to Gesellsch. f. Geburtsh. u. Gynäk. z. Berlin. Dec. 10, 1886. (Wm). Complete ectopia, retroflexion.
- Thorner, E.: Ueber eine Hemmungs-Bildung des Amnion bei einem menschlichen Foetus verbunden mit anderweitigen Missbildungen, Müller's Arch. f. Anat., 1869, pp. 200-6, Pl. VI A. (Chu). Complete eventration, deformed pelvis displaced to left, spina bifida.
- Todd, G. B.: A Case of Foetal Malformation Showing Ectopy of the Liver, Omentum, and Bladder, Lancet, London, 1895, ii, 142-3. (Chu).
- Tourneux, F., and Wertheimer, E.: Description d'un monstre célosomien avec spina bifida (Hydrorachis interne), Jour. de l'anat. et physiol., etc., Par., 1882, xviii, 578-87. (Wm).
- Ulrich, G. L.: Deformationem foetus humani rariorem describens, Inaug. Diss., Marburg, 1833, 16 pp. (Wm). Abd. fissure.
- Underhill, C. E.: Case Report (no title), Tr. Obst. Soc. Lond., (1880-81) 1881, vi, 78. Meeting of Mar. 23. (Wm). Retroflexion, transverse presentation, spina bifida.
- Van Deusen, E. H.: Monstrosity by Defect; Abdominal Walls and Diaphragm Absent, Tr. Homeop. Med. Soc. Penn., (1890) 1891, xxvi, 149-52. (Chu). Rotation of spine and sharp retroflexion.
- Verrier, E.: Dystocie tératologique; note sur un cas d'éventration foetale avec un seul membre inférieur, considéré au point de vue de la dystocie, Médecin prat., Par., 1882, iii, 589-93. (Wm). Viscera presenting.
- Voron, and Grivet: Placenta previa. Malformations foetales multiples, Bull. Soc. d'obst. et de gynéc., 1923, xii, 118-9, 1 pl. (Wm). Eventration, adhesion of placenta to head.
- Vrolik, W.: Tabulae ad illustrandam embryogenes in hominis et mammalium, tam naturalem quam abnormem, 1854, Lipsiae, 224 pp., 100 pl. T. O. Weigel. (Wm). (not seen) (Latin and German title pages, Latin and Dutch text). Retroflexion of trunk, Pl. 21 and 22.
- Wedl, C.: Bauchspalte eines sechsmonatlichen menschlichen Fötus, Ztschr. d.k.k. Gesellsch. d. Aerzte in Wien. Med. Jahrbücher, 19th year, 1863, i, 143-8. (Wm).
- Wertheim, C. C.: Vollständiger Mangel des Kreuz- und Steissbeins bei einem Neugeborenen, Monatschr. f. Geburtsk. u. Frauenkr., 1857, ix, 127-31. (Chc). Spine ends with last lumbar vert. Cystic tumor replaces sacrum.
- White, C.: The Pelvis with Congenital Absence of the Sacrum, Jour. Obst. and Gynec. Brit. Emp. Lond., 1911, xix, 478-81, 2 pl. (Chc).
- Winkler, F. N.: Ist Ektopia viscerum vielleicht nur eine Folge abnormer muskelinsertionen an der Rückseite des Rumpfes? Arch. f. Gynaek., 1877, xi, 3, 564-7. (Chu). Pelvis inversa, scoliosis, unusual insertion of glutei.
- von Woerz, H.: Eine Missbildung mit Amnionnabel, Ektopie der Blase, Symphysenspalte und Spina bifida, Zentralbl. f. Gynäk., 1891, xviii, 14-7. (Chc).
- Wolfe, S. A.: Report of a Case of Cylosoma, a Rare Fetal Monster, Am. Jour. Obst. and Gynec., April, 1925, ix, No. 4, 510-4, 1 fig. (Wm).
- Wolfe, B.: Ueber Missbildungen mit einfacher Nabelarterie, Arch. f. Gynäk., 1899, lvii, 635-61, Pl. XXVI. (Chu). 2 cases illustrated. One with eventration, spinal and pelvic defects.

PLACENTA PREVIA ASSOCIATED WITH MAJOR FETAL ANOMALIES

See articles by Breus, Commiskey, Genova, Hein, Hertzfeld, Klautsch, Lewis, Lichtenstein, Strassmann, Stute, Voron and Grivet, as cited above. Also, Greenhill, J. P.: The Association of Foetal Monstrosities and Deformities with Placenta Previa, Surg., Gynec. and Obst., 1923, xxxvi, 227-31. (Chu). Wilhelm, J.: Ein Beitrag zur "Foetalen Eventration," Inaug. Diss., Jena, 1906, 36 pp. G. Neuenhahn. (Wm). Photostat copy placed in (Chu). Circumvallate.

SPONDYLOLISTHESIS

Neugebauer, F. L.: Spondylolisthesis et Spondyl-Izeme, Par., 1892. English Tr. by New Sydenham Society, 1888, cxxi, 64 pp. (Chc). Cases in later life, many figures, attempts compilation of all on record.
 Neugebauer, F. L.: Bericht über die neueste Kasuistik und Literature der Spondylolisthesis, mit einschlagigen Bemerkungen über die Differential Diagnose, Ztschr. f. Geburtsh. u. Gynäk., 1893, xxvii, 348-438, 45 text figs. (Wm). Adds to previous compilation 8 clinical cases and 7 dissections.
 Perrone, A.: Ueber kongenitale Skoliose, Ztschr. f. orthop. Chir., 1906, xv, 353-89. (Chc). Critical review and summary.
 Schwartz, G.: Ätiologie und Genese der Spondylolisthesis, Inaug. Diss., Strassburg, 1901, 34 pp. (Wm). Bibliogr. Critical discussion.
 Taylor, J. M., and Winsor, H.: A Collective Review of the Literature of Spondylopathology, in their A Study of Sympathetic and Vasomotor Pathology, etc., Philadelphia, 1922. (Chu). cf. pp. 9-21. Correlation of congenital anomalies with visceral and other disease.

SPINA BIFIDA

Woltman, H. W.: Spina Bifida: a Review of 187 Cases, Including Three Associated Cases of Myelodysplasia Without Demonstrable Bony Defect, Minn. Med., 1921, iv, 244-59. (Chc). Critical review with unsuccessful attempt at classification.

APPLICATION OF THE FORCEPS TO THE TRANSVERSE HEAD FOR DELIVERY OF PERSISTENT OCCIPITOPOSTERIOR CASES*

BY HERVEY C. WILLIAMSON, M.D., NEW YORK, N. Y.

WE are all aware of the frequency of the occipitoposterior position and to many, its management is something of a *bête noir*. Labor with the head in this position often results in premature rupture of the membranes, long delay in the dilatation of the cervix and secondary inertia before rotation occurs. As the baby's back extends to accommodate itself to the posterior part of the flattened uterine ovoid, deflection of the head takes place. The syncipital and occipital ends of the head, lever, balance with the head in half extension as soon as the contractions force it against the cervix or the pelvis. This leads to the passage of the occipitofrontal diameter of the head through the pelvic cavity with consequent delay.

If secondary inertia develops, the labor should usually be terminated. At this time the head is generally unrotated and in midpelvis, with the cervix not completely dilated.

*Read at a meeting of the New York Obstetrical Society, May 12, 1925.

There are four methods of terminating the labor. The first is by external manual rotation of the shoulders at the same time that the occiput is lifted forward by vaginal manipulation. The patient may then be allowed to deliver spontaneously or forceps may be applied to the head in the anterior position. The difficulties attending the success of this procedure are great and the head usually returns to its original position.

The second method is version and may be used if the head is unengaged or lying in the inlet of the pelvis. Before electing this operation, one must make certain that the pelvis is not contracted and that

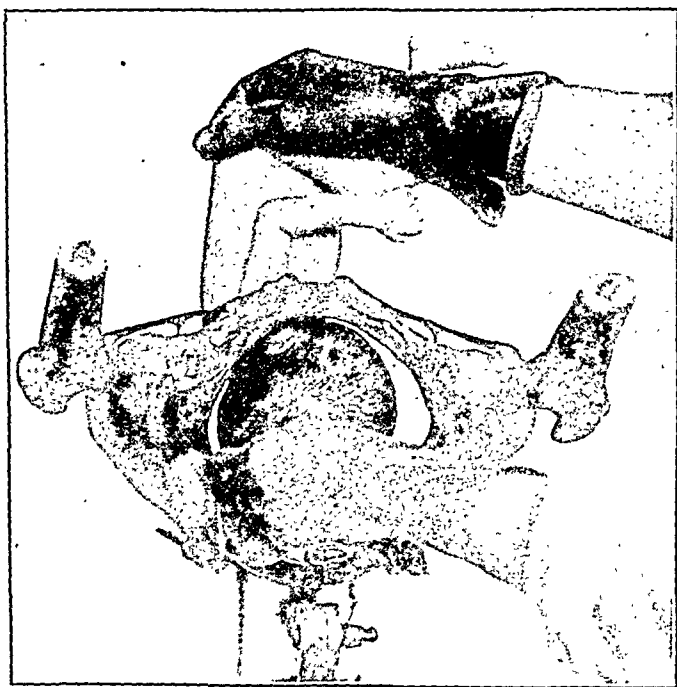


Fig. 1.—Rotation of the head to the transverse position.

the lower uterine segment is not unduly thin. As a rule version is not to be performed after unsuccessful attempts at delivery by forceps because of the danger of rupture of the uterus.

The third method consists of the application of forceps to the head in the occipitoposterior position, with traction and rotation. Reapplication of the forceps is made when the head is in the anterior position. This double application is known as the Seanzoni procedure. In 1915 it was modified by Bill who applied the forceps to the head in the posterior position and then raised the handles so that flexion was secured. This left the well-molded, nearly round occiput to be rotated by swinging the forceps handles in an arc. Under these conditions rotation is almost instantaneous because there is practically no re-

sistance to overcome if the head be in midpelvis. After rotation and slight traction the forceps is reapplied.

The fourth method, which I wish now to describe, has the advantage of requiring but a single application of the forceps. It is a combination of manual rotation of the head to a transverse position and the application of the forceps with the posterior blade in the hollow of the sacrum and the anterior blade under the symphysis. The blades thus face the occiput so that reapplication is not necessary.

TECHNIC

It has been found that the best instrument for this and other mid-pelvic work is an Elliott forceps. The model that we use differs from the instrument generally sold in having a longer shank, better head

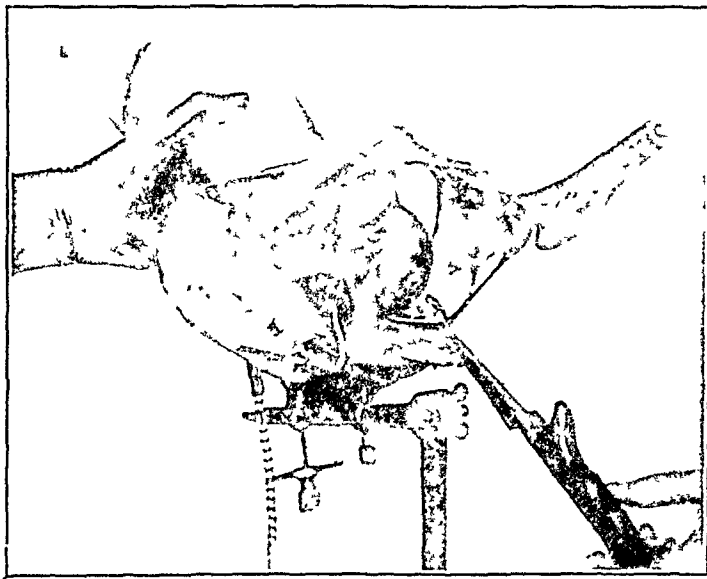


Fig. 2.—Introduction of the posterior blade of the forceps.

curve, and wider opening at the tips. The measurements are: 39 cm. total length; 10 cm. length of shank; 8 cm. between the blades at the maximum of the curve; 3 cm. between the tips; and 8 cm. from a level surface to the summit of the blades.

A positive diagnosis of the position is made by the palpation of an ear with the whole hand in the vagina. If one takes this precaution the head should never be drawn out in a posterior position. The next step is to introduce the proper hand to rotate and hold the head, the left hand in an R.O.P. and the right in an L.O.P. The hand is cupped in such a manner that the fingers are posterior to the head with the occiput lying in the palm. The palm then simulates the levator ani muscle. If this procedure does not rotate the head readily, firm pressure is made with the other hand upon the fundus, thereby forcing rotation on the artificial levator. By this maneuver, flexion is secured

and the head held in the pelvis. This step is the crux of the whole procedure.

With the head in the transverse position, the success of the single application of the forceps depends upon the proper technic in the insertion of the blades. In the R.O.P. position, the right blade of the forceps is applied posteriorly and should be introduced first. Without withdrawing the hand which has acted as the levator, the blade is passed in the midline and the handle depressed. This is necessary in order to avoid the promontory and it keeps the blade in close apposition to the head. The hand being now withdrawn, the blade will hold the head in the transverse position. The second blade (left) is now introduced along the side of the pelvis and rotated into position. The technic is important as the blade has to pass over the baby's

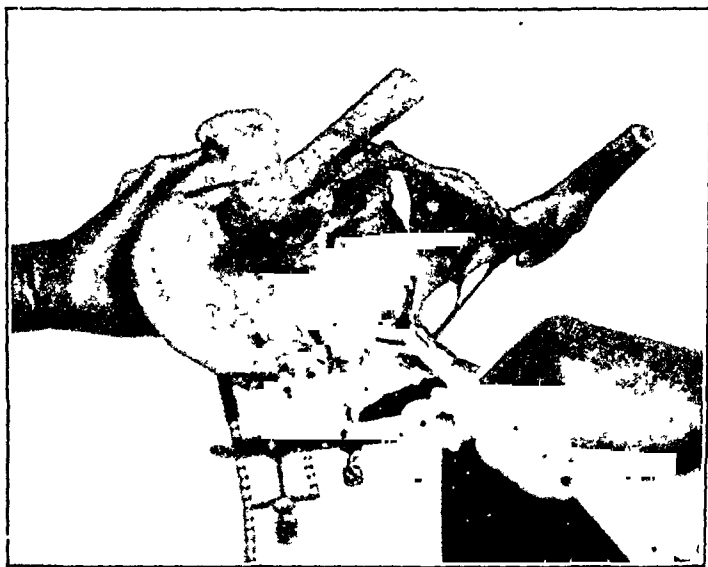


FIG. 3.—The anterior blade introduced along the side of the pelvis.

face. Its placing will be facilitated by depressing the handle, which will then cause the blade to slide with the utmost ease forward beneath the symphysis to the biparietal diameter of the head. Inasmuch as the right blade was introduced first it will be necessary to cross the handles before they can be locked; this is easily accomplished. In the L.O.P. position the left blade, as usual, is first introduced. The technic is the same as described for the R.O.P. except that the handles do not have to be crossed.

The interesting feature of this procedure is now apparent, namely, that in many cases when the forceps is locked, the head instantly rotates to the anterior position. In those cases in which it does not, only slight rotation is necessary to accomplish this result. Rotation must always be completed before traction is made. Under these conditions there is no danger to the soft tissues.

The delivery is then made as in any other anterior position. For

the midpelvic operations episiotomy will often help before traction as it gives, unconsciously to the operator, a better direction of pull. The incision should be made from the center of the fourchette to a point midway between the anus and the tuberosity of the ischium (mediolateral), thereby avoiding all danger to the sphincter.

The single application of the forceps has been used in a few cases of high forceps with good results. It may be better in the high forceps operation to draw the head to midpelvis in the posterior position after which the technic just described can be followed. There are two conditions in which this method is not advised. If the head is well

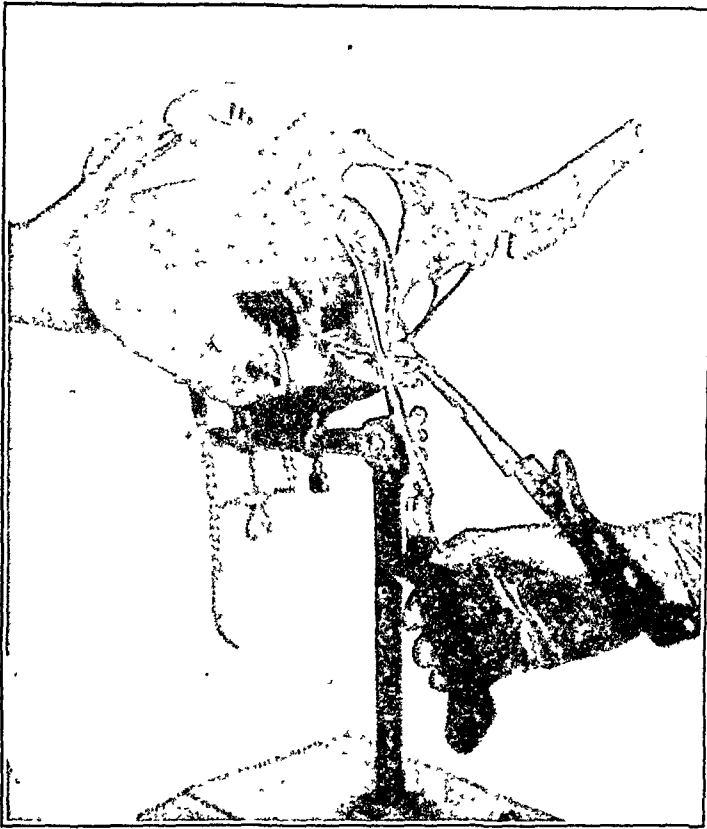


Fig. 4.—The anterior blade is rotated into position.

on the perineum in a posterior position, a rare occurrence in a primipara, it is usually better to draw it out in that position than to attempt 180 degrees of rotation. In a funnel pelvis, if the head is deeply placed in a posterior position, it is often better to extract in that position as the ischii converge and the bulkier part of the head is allowed to escape in the posterior triangle which is bounded laterally by soft tissue.

STATISTICS

One hundred mid- and high forceps cases treated by this technic are reported. They are as follows: Thirty-nine from the Second Obstetrical Division of Bellevue Hospital, 23 from the Manhattan Maternity and Dispensary, and 38 from private and consultation cases. At

Bellevue Hospital and at Manhattan Maternity these operations were performed either by me or by members of the staff who follow this technic.

FORCEPS:	HIGH	MID A.	MID B.	MID (Unclassified probably B.)
Bellevue	12	12	11	4
Manhattan	0	5	9	9
Private	1	28	9	0
Totals	<u>13</u>	<u>45</u>	<u>29</u>	<u>13</u>

At Bellevue Hospital there were no maternal deaths and no stillbirths. One baby of 3890 grams died on the fifth day with meningeal symptoms. One of the babies had signs of intracranial hemorrhage but recovered. Five babies had facial paralysis which promptly

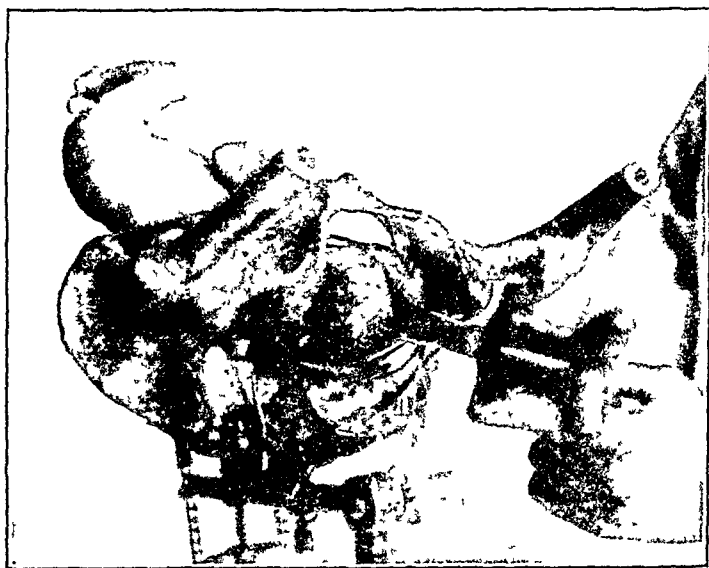


Fig. 5.—The forceps in position.

cleared up. In two of the high forceps cases the single application was made after the head was drawn up into the pelvis.

At Manhattan Maternity and Dispensary there was no stillbirth due to the forceps procedure and but one neonatal death. This was a child of 2750 gm. who died on the twenty-ninth day, of cerebral hemorrhage. There was one stillbirth due to an occult prolapsed cord and one neonatal death due to an imperforate anus.

At this institution one mother died. This patient was forty-one hours in labor. A median B forceps operation was done for a deep transversely placed head. A living 3825 gm. baby was delivered with difficulty. The patient went into a shock and died later that day. The autopsy showed a degeneration in a small area of the wall on either side of the lower uterine segment, and sections of this area revealed an infected, hemorrhagic necrotic process with an opening into the abdominal cavity on the left side, the size of a dime. Apparently this perforation was due to pressure necrosis.

In the private and consultation cases there was no maternal death. There were four stillbirths but none could be attributed directly to this maneuver. In the first no fetal heart sound was heard before delivery; in the second the head was easily extracted but shoulder delivery was very difficult, the baby weighed 4500 grams; the third was seen in consultation and the family physician had given 3 c.c. of pituitrin at intervals before the operation, which was very easy; the fourth occurred in an eclamptic patient on whom labor was induced. In the entire series there were five stillbirths and three neonatal deaths. One of the stillbirths and two of the neonatal deaths might be attributed to the forceps operation.

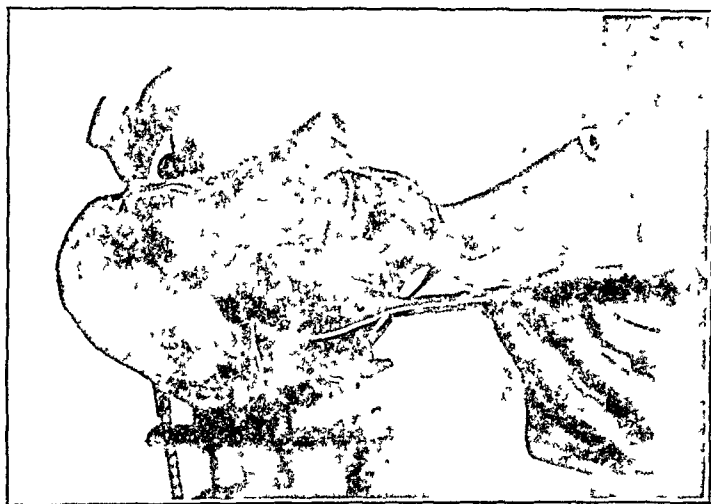


Fig. 6.—Anterior rotation completed

SUMMARY

The principle of this procedure is the application of the forceps to the head lying in a transverse position in the pelvis. In the maneuver to deliver the occipitoposterior head by one application of the forceps the hand is introduced into the vagina, the head rotated to the transverse position and the posterior blade of the forceps introduced into the hollow of the sacrum. The second blade is inserted along the sides of the pelvis, the handle depressed and the blade placed on the side of the head beneath the symphysis. The important feature in the introduction of the blades is to depress the handles. Rotation takes place spontaneously in many cases and very easily in the others. It should always be complete before traction is made. Extraction is the same as in any other anterior head position.

REFERENCES

- Scanzoni: *Lehrbuch der Geburtshilfe*, 1853. Ed. 2. 838-840.
 Bill: *Am. Jour. Obst.*, March, 1915, lxxi, 486-492.

HEART OUTPUT DURING PREGNANCY

BY H. J. STANDER, M.D., E. E. DUNCAN, M.D., AND W. E. SISSON, M.D.,
BALTIMORE, Md.

(From the Department of Obstetrics, Johns Hopkins University and Hospital)

IN view of the increase in body weight, in blood volume,¹ and in the size of the uterus during pregnancy, one might suspect that the gravid state is also associated with an increased cardiac output. During the latter part of pregnancy the response to effort becomes restricted, as is evidenced by the appearance of breathlessness upon an exertion which hitherto had been accomplished with ease. However, up to the present no one has adduced direct evidence to show that the heart does more work during pregnancy. In order to gain such information we have studied the cardiac output in animals both in the nonpregnant and pregnant state.

The amount of blood which passes through the lungs in unit time, or the so-called "minute volume," has been directly studied in goats by Barcroft, Boycott, Dunn and Peters.² These investigators employed the principle of Fick³; later elaborated by Zuntz,⁴ according to which

$$\text{M.V.} = \frac{\text{O}}{\text{A} - \text{V}}$$

where M.V. = minute volume; O = total oxygen in c.c. used by the animal per minute; A = the c.c. of oxygen in 1 c.c. of arterial blood; and V = the c.c. of oxygen in 1 c.c. of venous blood.

E. K. Marshall, Jr.,⁵ has developed a technic for applying this direct method to the dog. In our experiments we have used dogs exclusively and have followed the technic of Marshall.

Method.—In our experiments we have found it necessary for the dog to receive considerable preliminary training so as to accustom it to the several procedures, and to allow us to subject it to various manipulations without manifesting excitement or without visible signs of pain. This is especially necessary for, should the animal become excited and struggle, the results obtained would be valueless. Consequently only well-trained and willing animals can be used. It might be noted that most of our animals behaved so well that it was never necessary to discontinue an experiment with a well-trained dog during the months of observation.

The principle of the method consists in determining the amount of oxygen the animal uses in unit time, and the oxygen content of its arterial and venous blood, respectively. From analyses of the inspired, or room air, and the expired air, one can determine the actual

amount of oxygen used. The expired air is collected for a definite period of time in a Douglas bag, and is measured and analyzed for oxygen and carbon dioxide. The arterial and venous blood samples are taken from the left and right sides of the heart, respectively, and are analyzed for oxygen content in a van Slyke apparatus.

Apparatus.—For the breathing part of the experiment we employ a tight fitting mask, which is made of plaster of Paris bandage moulded over the muzzle of the animal, allowed to dry, and then soaked in paraffin in order to render it air-tight. The mask is connected by means of a short rubber tube to a Lovèn valve, the rubber coverings of which are frequently changed. The Lovèn valve communicates through a two-way valve with a twenty-five liter Douglas bag. For measuring the volume of the expired air, we use a three liter wet-

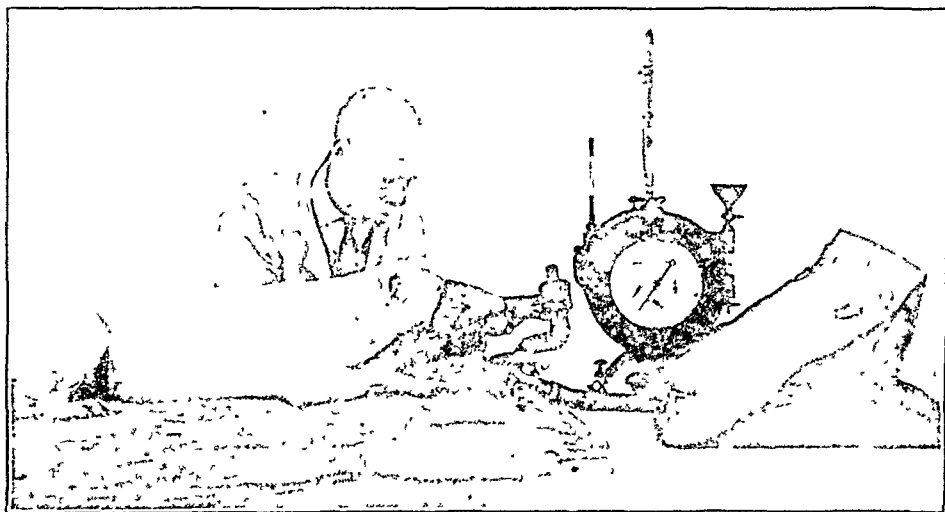


Fig. 1.

meter. The analysis of the expired air is carried out in a Haldane gas analysis apparatus.

To obtain the blood specimens, we puncture the heart with a 3.5 inch, 20-gauge needle. The needle is attached to a 10 c.c. Luer syringe, which contains about 2 c.c. of paraffin oil. The blood sample, as soon as obtained, is transferred to a small bottle containing paraffin oil and a sufficient quantity of oxalate to prevent clotting.

Technic.—After all preparations have been made, the dog is placed on a well-padded table and allowed to rest for half an hour. The skin over the point of maximum impulse of the heart is then cleaned and the area anesthetized with 2 per cent procaine. A second area on the right side, corresponding to the P.M.I., but one interspace higher, is similarly treated. The animal is now connected with the breathing apparatus by means of the mask, which is rendered completely air-tight with soft plasticene. The dog is allowed to breathe for about a minute and then the two-way valve is connected with the Douglas bag. The animal now breathes into the bag for, say, four minutes, a

stop watch being used to measure the time. At the end of the breathing period the bag is closed by turning the two-way valve, the mask is disconnected, and the dog turned on its back and held gently while the heart punctures are made. It is not necessary to use any force to keep the well-trained animal in position.

The arterial blood sample is procured by introducing the needle through the skin on the left side of the animal, at the point of maximum impulse, and then pointing it downwards in a line at right angles to the surface. The needle enters the left heart at a depth of about 1.5 inches in the average sized dog. As soon as the needle enters the cavity of the ventricle, the blood is forced up into the syringe at each heart beat.

The area of selection for puncturing the right heart is a point on the right side of the sternum one interspace higher and slightly more lateral than the left puncture point. In this case, the needle is introduced in a slightly caudal direction and towards the left side of the animal. After some experience, one learns to make the punctures

TABLE I
RESULTS OBTAINED FROM NONPREGNANT DOGS

DOG	DATE	CONDITION	WEIGHT	PULSE	SYSTOLIC OUTPUT	MINUTE VOLUME
No. 1	1/13/25	Normal	12.4 kg.	124	26.1 c.c.	3243 c.c.
	1/29/25	Normal	11.8 kg.	112	29.2 c.c.	3269 c.c.
	4/22/25	Normal	14.3 kg.	140	22.8 c.c.	3196 c.c.
No. 2	1/15/25	Growing	9.7 kg.	160	7.9 c.c.	1271 c.c.
	1/28/25	Growing	9.5 kg.	135	8.5 c.c.	1140 c.c.
	2/24/25	Growing	11.3 kg.	112	14.8 c.c.	1653 c.c.
No. 3	11/12/24	Normal	11.3 kg.	88	14.5 c.c.	1275 c.c.
	12/23/24	Normal	10.9 kg.	112	10.9 c.c.	1221 c.c.
	1/22/25	In estrus	10.6 kg.	116	15.9 c.c.	1842 c.c.
	1/31/25	Normal	10.4 kg.	100	15.4 c.c.	1540 c.c.
No. 4	1/14/25	Normal	10.9 kg.	130	15.5 c.c.	2017 c.c.
	2/26/25	In estrus	13.4 kg.	108	23.1 c.c.	2497 c.c.
	10/24/25	Normal	11.8 kg.	100	15.0 c.c.	1502 c.c.

TABLE II
DOG No. 5. CONDITION BEFORE, DURING, AND AFTER THE PREGNANT STATE

DATE	CONDITION	WEIGHT	PULSE	SYSTOLIC OUTPUT	MINUTE VOLUME
12/20/24	Nonpregnant	17.4 kg.	104	30.7 c.c.	3193 c.c.
1/ 8/25	Nonpregnant	16.8 kg.	106	28.4 c.c.	3015 c.c.
1/24/25	Nonpregnant	17.0 kg.	94	33.3 c.c.	3135 c.c.
2/12/25	Nonpregnant	16.9 kg.	96	29.0 c.c.	2785 c.c.
2/28/25	Nonpregnant	16.8 kg.	106	29.1 c.c.	3091 c.c.
6/ 2/25	Pregnant	19.3 kg.	130	29.6 c.c.	3844 c.c.
6/15/25	Pregnant	19.5 kg.	101	36.4 c.c.	3784 c.c.
6/19/25	Pregnant	20.9 kg.	101	41.7 c.c.	4341 c.c.
6/24/25	Pregnant	21.0 kg.	120	34.7 c.c.	4165 c.c.
7/11/25	Puerperal	17.7 kg.	100	35.1 c.c.	3514 c.c.
8/ 5/25	Puerperal	16.8 kg.	96	34.1 c.c.	3277 c.c.
9/ 3/25	Normal	16.4 kg.	96	31.5 c.c.	3027 c.c.
10/20/25	Normal	19.3 kg.	102	30.1 c.c.	3072 c.c.

NOTE: This dog was delivered June 28, 1925, of four young.

TABLE III

DOG NO. 6. CONDITION BEFORE, DURING, AND AFTER THE PREGNANT STATE

DATE	CONDITION	WEIGHT	PULSE	SYSTOLIC OUTPUT	MINUTE VOLUME
2/21/25	Nonpregnant	15.0 kg.	116	21.4 c.c.	2484 c.c.
3/19/25	Nonpregnant	16.3 kg.	100	21.2 c.c.	2117 c.c.
4/ 7/25	Nonpregnant	15.9 kg.	95	29.1 c.c.	2769 c.c.
4/18/25	Nonpregnant	16.8 kg.	104	20.8 c.c.	2166 c.c.
4/20/25	Nonpregnant	17.0 kg.	106	26.4 c.c.	2798 c.c.
10/ 6/25	Pregnant	23.7 kg.	100	37.8 c.c.	3781 c.c.
10/15/25	Puerperal	18.0 kg.	100	29.2 c.c.	2919 c.c.
10/23/25	Puerperal	17.4 kg.	106	22.8 c.c.	2420 c.c.

NOTE: This dog was delivered October 6, 1925, of nine young.

without difficulty, and feels sure that one has entered the left or right ventricle, as the case may be.

The blood samples are at all times out of contact with the air, and are kept under oil until analyzed. The analyses should be done within twelve hours, as the blood might change in its oxygen content on standing.

Calculations.—From the analysis of inspired and expired air, one obtains the percentage of oxygen actually absorbed by the animal. From the total amount of expired air, reduced to standard conditions of pressure and temperature, the percentage of oxygen used and the length of the breathing period, we can determine the volume of oxygen absorbed, or "O" in the equation,

$$M.V. = \frac{O}{A-V}$$

The actual volumes per cent of oxygen in the specimens of arterial and venous blood give us the "A" and "V," respectively, in this equation, while "M.V." is the minute volume.

Results.—We have experimented on six well-trained female dogs, four of which remained nonpregnant, while two became pregnant. In Table I we give the results obtained in the first group, while in Tables II and III are shown the values for the two dogs which became pregnant, and the conditions obtaining before, during, and after that state.

The figures for the nonpregnant animals show that the method is dependable, as is evidenced by the fact that the heart output varied very slightly during the entire course of observation. The minute volume has a much more constant value than the systolic output, as already shown by Marshall.

In two of the animals, No. 3 and No. 4, we were able to procure values for the minute volume during the estrus cycle. These indicate that the cardiac output is increased at that time. Marshall, in a personal communication, states that he has obtained similar results in his detailed studies on the estrus cycle and the minute volume in dogs. It is evident that several factors are involved in the problem, and, from our few determinations during the estrus period, we can

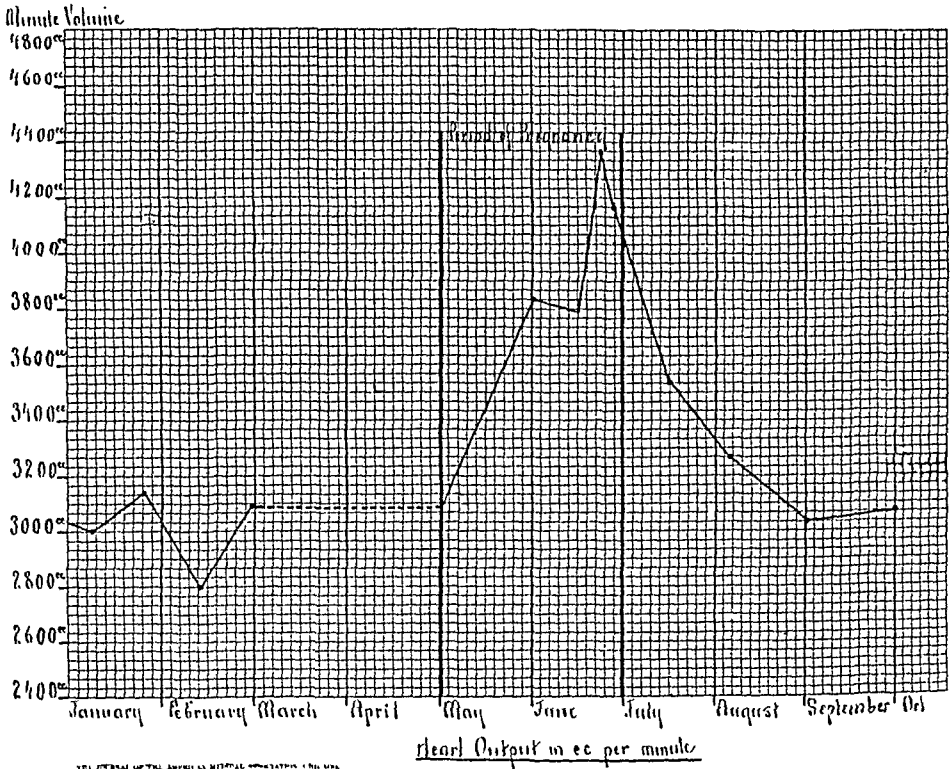


Fig. 2.

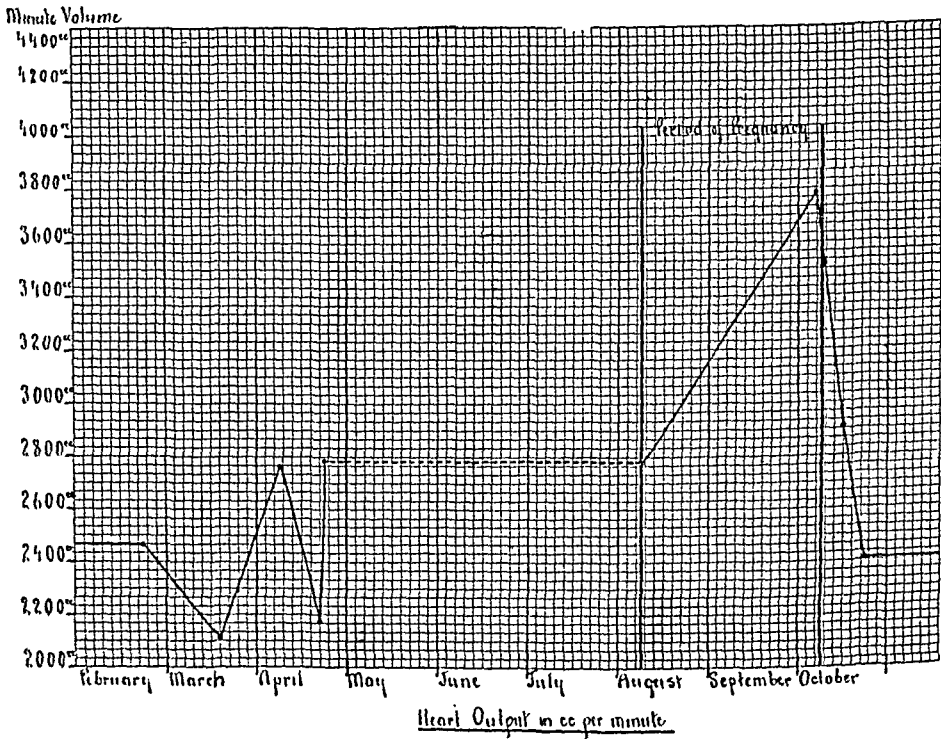


Fig. 3.

only say that there is a definite tendency toward a higher cardiac output.

During pregnancy the results are quite definite and instructive. Dog No. 5 had an average minute volume of 3073 c.c. before preg-

nancy. About one week before delivery her minute volume had risen to 4165 c.c., and within one month after delivery her heart output had fallen to 3277 c.c. per minute. Two determinations made two and three months, respectively, after delivery gave a minute volume of about 3050 c.c. The changes noted in this animal are shown in Fig. 2.

Dog No. 6 shows even more strikingly the increase in cardiac output during pregnancy. Before gestation, her heart pumped 2467 c.c. of blood per minute, but just prior to delivery, and while evidently in labor, the figure rose to 3781 c.c., an increase of 53 per cent. After delivery it gradually dropped, and two weeks later was 2420 c.c. per minute. Fig. 3 records these changes graphically.

DISCUSSION

Since we have demonstrated that the cardiac output is increased from one-third to one-half during the latter part of pregnancy in the dog, and as we know that pregnancy is not associated with a fall in blood pressure, it becomes apparent that the heart is called upon to perform a greatly increased amount of work. This is undoubtedly due to the uteroplacental circulation, the general increase in body weight, and to such disturbing factors as displacement of the heart and interference with the shape and movements of the chest.^{6, 7}

Pregnancy in the dog is associated with a general increase in body weight of about 25 to 50 per cent, depending upon the size of the litter, while in the human we note an increase of only about 20 per cent. Accordingly, it is conceivable that the increase in cardiac work during pregnancy may be somewhat less in women than in dogs.

Whether this additional work is effected by actual hypertrophy of the heart or merely by drawing upon the reserve force of the heart has not yet been decided. Mackenzie believed that no hypertrophy occurs in the normal pregnant woman, while other investigators note a slight increase in size of the heart. However this may be, it is apparent that some mechanism must be called into play to meet the increased demands of pregnancy.

Generally speaking, it would appear that in the normal individual this demand is met without difficulty, but that in those presenting a definite cardiac abnormality, such an added strain cannot be regarded with indifference. In the latter circumstances, it is necessary for us to employ every means at our disposal to evaluate the cardiac reserve force and to determine whether it is sufficient to meet the added demands of pregnancy.

CONCLUSIONS

1. The minute volume of the heart has a far more constant value than the systolic output.
2. The cardiac output of the nonpregnant dog varies only within slight limits.

3. During pregnancy the minute volume is markedly increased, being one-third to one-half greater than before.

4. Following labor the minute volume gradually falls and regains the nonpregnant value within two to three weeks.

5. During the estrus cycle our studies indicate that changes occur similar to those in pregnancy, but to a slighter degree.

6. Whether the increased output in pregnancy is the result of hypertrophy of the heart, or not, has not been determined, but it appears probable that, at least in part, it is accomplished by drawing upon the reserve force of the heart. For this reason, it would seem that before expressing a prognosis in cases of pregnancy complicated by abnormalities of the heart, one should always attempt to evaluate the reserve force of the heart.

7. A direct method for determining the cardiac output in women would enable us to make an intelligent prognosis in cases of pregnancy complicated by heart disease; but until a suitable method becomes available, we shall have to be content to base our prognosis upon the available clinical data.

We wish to express our appreciation to Prof. E. K. Marshall, Jr., for his suggestions and advice in our investigations and to Dr. C. H. Peckham for valuable help in some of the experiments.

REFERENCES

- ¹Stander, H. J., and Creadick, A. N.: Bull. Johns Hopkins Hosp., 1924, xxxv, 1.
- ²Barcroft, J., Boycott, A. E., Dunn, J. S., and Peters, R. A.: Quart. Jour. Med., 1919-1920, xiii, 35.
- ³Fick, A.: Sitzungsber. d. phys.-med. Gesellsch. zu Würzb., 1870, 16.
- ⁴Zuntz, N.: Deutsch. med. Wehnschr., 1892, xviii, 109.
- ⁵Marshall, E. K., Jr.: Am. Jour. Physiol., 1925, lxxii, 192.
- ⁶Mackenzie, James: Heart Disease and Pregnancy, London, 1921.
- ⁷Frey, Walter: Herz und Schwangerschaft, Leipzig, 1923.

STERILITY-FERTILITY STUDIES IN ANIMALS AND THEIR BEARING ON HUMAN PROBLEMS*

By R. L. DICKINSON, M.D., NEW YORK

(From the Committee on Maternal Health)

THE standard textbook, Marshall's *Physiology of Reproduction* (1922), expounds in such detail and perspective, and refers so fully to the literature, that one need only touch on special points among animals in general. Many suggestive investigations are available concerning pedigreed quadrupeds, such as the mare and cow, which have a gestation period like that of woman. They differ from human beings in that they are of such high value that elaborate studies of fertility and sterility pay; they have a fixed date for isolated copulation; they permit the act only a few hours every three weeks; such dates are registered, and, last of all, each patient may come to autopsy. Data thus accessible are rarely presented in human unions.

Do the small ovaries sometimes found in sterile women (with other genital organs normal) necessarily indicate defective ovulation? Not if we are to judge by the cow. Her right ovary measures five-eighths to three-fourths of an inch in diameter. The left is frequently less than one-fourth the volume of the right, but this small ovary functions nearly as actively as its fellow. Williams found, in the abattoir, in 1700 pregnancies, 55 per cent in the right and 45 per cent in the left horn of the uterus. Incidentally we may note that Zschokke, of Zurich, reported that in heifer calves, only 70 per cent of the ovaries were normal; 8 per cent had fibroid and various tumors; others, chronic oophoritis (usually tuberculous), while sclerosis, and persistent corpus luteum were present also. Albrechtsen claims that 86 per cent of cure of ovarian inflammation and delayed ovulation is the result of curing infections along the genital tract. F. C. Holden has stressed cervical and other birth canal infections as causes of ovarian disorders, many of which have to do with sterility, but he lacked the Dane's diagnostic advantages. The veterinary can reach every part of the genital apparatus through the thin rectal wall and verify the diseased conditions and the shrinkages that result from cure of infection.

What is the bearing of *persistent corpus luteum* on amenorrhea and sterility?

The lack of absorption of the yellow body is asserted by Zschokke to be due in cattle, to some foreign material in the uterus, such as fetus, retained placenta, or pathologic discharges. Some persistence

*Read before the New York Obstetrical Society, January 13, 1925.

is said to be due to feeding with malt or slop from sugar beet (suggesting our swiftly developing human sugar-fat sterility). Nielsen first expressed the persistent corpus luteum and reported most cases of sterility cured thereby. Persistence is said to be found in 70 per cent of sterilities and, in the worse conditions, to be accompanied by metritis. Albrechsen ignores the corpus itself and focuses his attention on the infection. Therefore in women we may query, by the vaginal smear test, whether infections in the genital tract suspend ovulation. The yellow body would be the center of suspicion. Such delay might well occur even under conditions less spectacular than in those instances of premature menopause reported by Oschner, which were found to be due to sudden chilling at the period and a resultant persistent corpus luteum, and shown by him to be curable by laparotomy and shelling out the offending mass. The veterinary has merely to reach into the bowel up to his elbow and by palpating through the rectal wall, clear out the yellow body with finger pressure. Thereafter, conception occurs in four days, 95 per cent of those so treated conceiving at the first service. It is possible that with thin and relaxed abdominal walls or a low-lying ovary, the human organ might be subjected to bimanual compression and the corpus ruptured. Halban, in speaking of amenorrhea due to corpus luteum cysts, while stating that these may subside spontaneously, draws attention to the ease with which they may be ruptured, owing to the thinness of their walls. Rubin suggests that unrecognized, absorbed, early gestation, intra- or extrauterine, may be the cause of corpus luteum cysts.

When a cow does not show estrum within sixty days after parturition, the delayed rupture is expedited manually. Perhaps doctors have been careless about resumption of menstruation after parturition and weaning, and in the absence of anemia or other adequate general reason to explain delay, they may have let ovaries neglect their duty and thereby have permitted one-child sterility to result. In cattle this question has a further practical bearing; by rupturing the yellow body four days before the desired heat, any preferred series of dates may be arranged for a bull which is overworked by the simultaneous estrum of his herd. Incidentally it may be noted that yohimbin is said by Williams to have no effect in producing estrum, though three writers have seen genital hyperemia in animals from its use. There is a report extant that a conspicuous pharmacologist has developed, by animal experiment, aphrodisiacs too effective to be published.

May small cysts in ovaries cause sterility or sexual excitability? Nymphomania with sterility occurs in all species of domesticated animals, but preeminently in the cow. It is never encountered in the pregnant animal. The symptoms are these: The heifer or cow bellows a great deal, even more than in estrum, and in a voice like a bull's. The actions are like those of an exaggerated estrum with mounting

of other cows or any other animal,—even man or a partition, or allowing estrous cows to mount her, and, with some exceptions, allowing copulation at any time. Thus, sexual appetite is intense in the presence of complete sterility. After a few weeks, the pelvic ligaments soften, the pelvis becomes deformed, and sacroiliac slipping produces a wabbling gait. Fractures of the pelvis are often seen. Atony of the genital canal occurs, with mucopurulent secretions. The course of this excitability is four or five years. Recovery occurs in 50 per cent of the cases. Chronicity is rare. It is particularly likely to take place in pedigreed dairy cows being forced for the severe tests and strain common to the endeavor to make official records for high milk and fat quantities. It cuts short the careers of many, so that prizes spell ruin.

Albrechtsen says the cause lies in abnormal ovaries, usually cystic, 74 per cent being single cysts, 8 per cent multiple, 6 per cent thick-walled and deep, and 2 per cent tuberculous. As a cause, he claims infections and reports 86 per cent of cures by abolishing the infection. Williams speaks as if it were in a special type of cystic degeneration that nymphomania occurs, the ovisacs being distended with follicular liquid, and no rupture taking place, no lutein tissue developing, and no spontaneous cure to be expected. The cysts are one to three inches in diameter, one to four in number, not multilocular, and as a rule, present in both ovaries. Even if showing in only one ovary, the cow is sterile.

The treatment consists of crushing the cysts through rectal palpation, or crushing or puncture by the vagina. Since copulation makes the disease worse, the cow is kept from the company of her mates.

It would be of the weightiest moment if animal studies could furnish *tests applicable to women which could determine the date of ovulation*. We then could tell (1) what day or days in the intermenstrual period we should select for coitus (or artificial impregnation) in order to *render conception most probable*, that we might time the arrival of optimum semen in the tubes to meet the ovum there; (2) whether ovulation has ceased, in a given case of *sterility* or amenorrhea; (3) at what exact period in the menstrual cycle ovulation occurs, in order to settle whether (and when) a "*safe*" period exists; (4) whether irradiation of the ovaries in various dosages arrests ovulation, and how long the effect continues; (5) whether sperm injections hypodermically (spermatoxins) are as effective in women as in lower animals, in checking ovulation and the duration of the effect; (6) whether one of the new extracts would or would not control ovarian activity, either by arrest or stimulation; (7) whether an early *pregnancy* is present; (8) whether regularly menstruating women ovulate every month or can show a skipping habit, and (9) whether some women ovulate more than once a month.

The Vaginal Epithelial Cycle and Ovulation.—Stockard and Papanicolaou, in 1917, discovered that in the guinea pig there is a change in the vaginal secretion recurring just before each ovulation, by which the cycle can be accurately followed during life. The vaginal fluid contains leucocytes and desquamated epithelial cells. Between the periods of estrus, cells of both types are present but not very numerous. A few hours before ovulation, however, the leucocytes disappear, and there is a general desquamation of cornified epithelial cells, which are often shed from the vaginal wall in large sheets. A few hours thereafter the leucocytes reappear in great numbers, the epithelial cells disintegrate, and finally conditions revert to the interestrous state.

Long and Evans, studying 1000 white rats during a period of four years, very fully picture in their monumental work the changes in the vaginal epithelium. "There appears at any one time only one type of epithelium, the changes taking place at the same rate over the entire mucosal surface." The proliferation of vaginal epithelium during proestrus, the production of keratin, the raising of the vacuolar epithelium, and the casting off in estrus are always typical. Loeb (1923) states that it is the substance given off by the mature follicle that combines with the vaginal acid and there produces the marked proliferation. Corner, in young macacus rhesus monkeys, which have a menstrual cycle not unlike that of human beings, found a tendency toward cycle variation. Ovulation occurred about fourteen or fifteen days after the onset of the last menstruation in two animals in which the ovum was recovered from the fallopian tube. In six others, menstruation probably took place without ovulation. Lehmann (1921), from smears made in the gynecologic clinic, works out four types. His idea is that different degrees of leucocytosis depend upon the bacterial condition of the lower genital tract and that normal ovarian function protects the vaginal walls against bacterial invasion.

The Committee on Maternal Welfare was fortunate in bringing together biologist and clinician on this matter, and a considerable series of human tests is under way at the Woman's Hospital, New York. The monkey, however, will be our intermediary for some time yet.

The day of ovulation in human beings.—Among the wives of German soldiers who, early in the war, were only at home from two to eight days, many hundred observations were made (Siegel, Pryll, Zange-meister), which showed that the last six or seven days of the intermenstrual interval were practically sterile. Siegel's 320 cases showed a fertilization curve reaching its highest point on the sixth day after the beginning of the period, remaining at nearly the same height until the twelfth or thirteenth day, then sloping evenly to the twenty-first, with no conceptions from the twenty-second to the twenty-eighth day. As the result of laparotomy inspections, R. Meyer and Ruge II, examining 106 specimens, placed ovulation in the first week of the inter-

menstrual interval; but Ruge later made it between the eighth and fourteenth day after the beginning of the flow. Schroeder, from observations in 100 operations, placed rupture between the fourteenth and sixteenth day after onset of the period. Mere inspection at operation, however, is said by Papanicolaou to be of very moderate value, without sections. Snyder, from the state of tubal epithelium, believes the thirteenth day to be the time of rupture.

"If," says Corner (1923), "we accept a regular ovulation occurring about the twelfth day—that is, from the tenth to the fifteenth day before the onset of menstruation, and assume the viability of the germ cells in the oviduct for a space of two weeks following coitus, then all the known interrelations of the human reproductive cycle can be seen to follow." He goes on to say that there is a bare possibility that, if all the causes of error be ruled out of such statistics as Siegel's, the human female might actually be found to be fertile only during a limited portion of each cycle near the day of ovulation. In the end, the problem, as it especially concerns our own species, "will be solved by taking into the clinic the great advances in method now in the making by physiologic anatomists."

We have made search for studies that would indicate the *frequency of intercourse most favorable* both for impregnation and health, and also any that will demonstrate what interval produces a semen that is optimum. In general, it may be said that the average frequency of coitus in cattle ranges close to that of human beings. Katherine Davis, studying 1,000 educated American couples, at about the age of thirty years, showed twice a week to be the most frequent habit, while 10 per cent cohabited daily or oftener. While the number of copulations which a bull should be permitted is said not to have been sufficiently studied, and there are known to be wide variations in the power of sexual endurance, yet veterinary practice is fairly agreed upon the following: In 2000 observations on brood mares, Pearson, Lee and Moore report the commonest frequency to be two foals produced by three coverings. The average productivity is said by Williams to be one viable calf for each three services. In an exceptionally healthy herd 43 per cent succeeded, with 40 per cent viable calves resulting. Two copulations a week is the probable maximum of efficiency measured by percentage of pregnancies, their safety, and the vigor of the young either with bull or stallion. Three cows in any one day is considered the limit by Zschokke, to be followed by a rest of one or two days. Noted stallions are said to have served 200 to 300 mares in a year, without injury. Clinically, bull after bull is found breaking down after very moderate use with too frequent service. Also the spermatozoa disappear entirely under these conditions. Younger animals are carefully guarded against overuse, being restricted to one-third of the service of full-grown adults.

Does the fertile period last many days? The cow is willing to take the bull once in three weeks. The bull in pasture promptly recognizes estrum. In controlled breeding, estrum is frequently too far advanced when discovered for coitus to succeed, many periods being overlooked. The healthiest cows have the shortest duration of estrum, frequently dropping to or below fifteen hours. So one has to watch a cow twice a day, or else lose three weeks.

Animal studies have a bearing on the question raised with human beings, concerning the relative importance of *ejaculation of semen directly into the uterus*. This process cannot occur in the cow, for the cervical canal is too small for any penetration by the bull's organ, and the copulatory injuries that sometimes occur are never in the cervix, but only in the vagina. Also it is found that after amputation of the bull's penis the relation is quite as effective as before. In heat, the cervix, always corrugated, is somewhat relaxed, and the canal, while not dilated, is more dilatable than at other times. The hyperemic cervix permits entry by the finger. On the other hand, in rams there is a phallic uterine installation tube, a long slender process. When this is cut off, as it is purposely done on the march to markets, conception cannot occur.

Does the cervix suck in semen? Heape has described such an action in the rabbit, the os uteri dipping down into the semen in the bottom of the vagina, to be withdrawn again in coordination with a rhythmical contraction by the uterine muscles. Human reports are conspicuous for their infrequency of actual observation of this action.

What studies of semen and testes in animals suggest research for betterment in the human male?

Testicles.—In the horse the testicles are rarely of the same size, the right being clearly the larger, as a rule. Firmness and density are found to be an important index of healthy organs. The commonest seat of infection is the tail of the epididymis. Cryptorchidism in bulls is likely to be passed on to progeny. The intraabdominal testicle does not function because it is in too warm a spot. An active testis after being transplanted inside the belly ceases to form spermatozoa. Testis grafts cease to form sperms if planted anywhere but in the right temperature, as in the scrotum. In the guinea pig, if the testis is exposed to heat 8 degrees above normal for five to ten minutes, the spermatozoa are killed and all the seminiferous tubules damaged; but the mother cells may recover and repair the damage. It is reported that some Japanese males may be sterile from hot baths, as the Japanese stand temperatures of 115 degrees readily.

As to the *best interval* for producing vigorous semen,—in dogs there was no betterment after a ten-day wait (Lloyd, Jones and Hays). This is in accord with a limited series of my own wherein seven to ten

days produced the best specimens, and thereafter the quality deteriorated.

Semen.—Horse semen kept at body temperature is killed by its own germ growth. After withdrawal from the vagina of mare and cow, the motility of the sperms persists about four hours under laboratory conditions. The spermatozoa traverse the twenty to twenty-five inches of the cervico-uterotubal canal in two or three hours. In the rabbit, Hensen estimates that the migration of the semen requires from fifteen minutes to two hours.

Williams gives several clinical studies of individual semens of bulls, with microphotographs. Where there is much abortion, the sperm was always found to be pathologic. He determined the presence of the streptococcus, Staphylococcus albus, and the colon bacillus in bulls whose fertility had lessened or disappeared. The author pictures small-headed and tailless and other abnormal forms familiar to the medical eye. Some of these animals yielded 30 per cent to 66 per cent of conceptions. Cows not conceiving with a bull below par, gave a higher or perfect ratio with other bulls. In an animal with a low motility sperm and 30 per cent conceptions and 38 per cent abortions, vesiculitis and spermato cystitis were found. After the death of the animal, cultures from the genitals were negative.

Sperm loses power in proportion to dilution. There is a direct relation between duration of fertilizing power and concentration. "The fertilizing substance is identical with the agglutinating substance of the spermatozoon, which is lost by staling" (Gemmil). Lillie says twenty-four hours is the likely limit of capacity to fertilize. Mall declares that sperms have lost their fertilizing power by the time they have passed the tube. In 25 cows killed for the purpose of study, Lewis found, in only three, sperms alive more than twenty hours. Boyce and Teacher (and Triepel also) conclude that fertilization must occur within forty-eight hours after copulation. Lillie shows that sperms are exceedingly sensitive organisms in several respects, and draws attention to the fact that motility is not a criterion of fertilizing power and that living the long periods claimed does not mean that the sperms can fertilize all that time. Their life depends not a little on the rapidity with which they use up their own energy. Constantly giving off CO₂, they make the fluid in which they are suspended sufficiently acid to inhibit their own movements. Thus immobilizing themselves in the testis, they save energy till ejaculation. Then the CO₂ is absorbed by the neutral prostatic secretion. Anything over 0.045 per cent solution of several acids kills horse sperm. Semen is buffered against both acids and alkalies (Heape). Anderson found the behavior of the semen of a large number of mammals to various agencies very similar.

Reactions between vaginal secretion and semen have been studied in guinea pigs by Papanicolaou, particularly the destruction of spermatozoa by phagocytes. The advantage of this study in lower animals is that they have a copulation period. Moreover, the cycle being exactly known, the action of various bacteria can be developed. Every form of bacteria in the vagina is found to have a modifying influence on the expressions of the cycle. The bearing of those facts on sterility is evident, and also on the use in the vagina of chemical agents and their vehicles as contraceptive agents. Kross, for instance, in his work at the Crocker Laboratory, tested the effect of Cary's formula on rabbits and found that 2 per cent lactic acid had no restrictive effect on conception.

Is semen absorbed? Do sperms penetrate the vaginal walls? Can excessive semen absorption cause sterility? Can dilutions of semen, given hypodermically, suspend ovulation?

Kohlbrugge reports that in normal copulation of rats and other rodents the spermatozoa penetrate the epithelium of the generative mucosa and invade the underlying connective tissue. If this process takes place in women, the sterility that is common among professional prostitutes may be in part due to spermatoxins; and this might be the cause of sterility with strong sperm, open tubes, proved ovulation, and very frequent intercourse. There is said to be an Abderhalden reaction to testicular proteins after every coitus.

Spermatoxins were produced in 1899 by Metchnikoff and by Landsteiner. The former developed an isospermic serum. De Leslie rendered male mice sterile in from four to five times the normal interval, by injection of spermatoxin serum.

Dittler found that by immunizing female rabbits with progressive doses of dilute rabbit ejaculation, they were made sterile for a period of four months or longer. He injected into the ear vein the fluid which he withdrew from the vagina after copulation, and which he gave at intervals of one to eight days, repeating the injection two to ten times until a total of 2 to 5 c.c. had been given. He continued the injection until an antibody had been found in the blood,—usually within six to eight days. Ovulation was not hindered, nor was behavior affected, and no anaphylaxis occurred. There was no individual specificity.

Guyer speaks of "spermatoxic" sera prepared by injecting fowls repeatedly with the sperm of rabbits which are toxic in vitro for the spermatozoa of both rabbits and guinea pigs. When introduced into the blood stream of male rabbits at intervals, for four to five weeks, such serum produced partial or complete sterility. Even complete disappearance of spermatozoa from the semen occurred. Microscopic examination of the testis of a serum-treated male showed disintegration changes taking place in the seminiferous tubules. The sper-

matozoa of a rabbit which has been repeatedly injected with its own semen are much less viable both in normal rabbit semen and in spermatotoxic serum than are normal spermatozoa.

McCartney found that (1) female rats could be sterilized for a period of from two to twenty-two weeks by subcutaneous injection of spermatozoa or testes extract, combining the work of Guyer and Dittler; (2) the sterility seems to be due to the presence of spermatoxins in the vaginal and uterine secretions of the immunized animal, and that (3) within limits, the degree of immunity appears to be proportionate to the amount of antigen injected. Kennedy found autospERM worked best and degeneration rare in the testicles of guinea pigs.

Sterility and genital infections.—Evans found rats had infections, often epidemic, not unlike gonorrhea. Their sterility runs from 10 to 15 per cent, the highest figures occurring among the domesticated albinos. Reynolds and Macomber report it as high as 20 to 35 per cent in certain strains. No animal carries infection in the birth canal more commonly than the sow. Among cows, there is a great frequency of placental retention (25 per cent). Infection of the genital canal in cows runs, in some herds, as high as 60 per cent. The descriptions exhibit curious parallels to those concerning women, along the lines of pyosalpinx, hydrosalpinx, and ovarian or pelvic abscess. Pyometra seems common, however, and the granular venereal disease widespread. The *Streptococcus viridans* is the most frequent organism found in the vagina, as also in the semen.

Abortions in heifers and cows run about 19 per cent. Ergot will produce abortion, but only just before it causes the death of the mother. Therefore, the best way to abort a cow seems to be to reach up into its bowel and rupture the corpus luteum of pregnancy. In from one to three days the uterus empties itself; this again raises the query as to whether the corpus luteum can be ruptured in thin women by rectoabdominal seizure, thereby interrupting pregnancy.

Is *sterility among apparently healthy animals* a common occurrence? We have noted the frequency among prolific animals like rats. The Danish Breeders' societies show from year to year a constant of 11 per cent sterility and abortions, taken together. Albrechtsen shows that temporary sterility averaged, in 112,400 head, close to 5 per cent. On some farms, 20 to 30 to 100 per cent are temporarily sterile; on others, none. He says 76 per cent is a good conception rate. It may be noted that in rats in the laboratory, pregnancy can be expected following 80 per cent of single copulation.

In bulls sterility is common and generally due to inflammatory trouble or infection of the seminal vesicles, or of seminiferous tubules and epididymis. No bull, says Williams, should be bought until his semen has been examined for motility, morphology, and bacteria. Liv-

ing spermatozoa, however abundant, do not in and of themselves afford proof of fertility. They may be deformed or diseased or the secretions of prostate and vesicles may contain germ growth fatal to them. Some sterile bulls apparently render females sterile.

Diarrhea or pneumonia in the young calf causes low fertility at adult age. Cervical atresia is a negligible cause of sterility, and endocervicitis constitutes the most common affection, as in women. Tuff, in 97 sterile cows, could identify disease in 64, mostly cervical catarrh. The assumption is false, says Williams, that a cow may be sterile with a very fertile bull and yet conceive with some other bull.

During the most active stages of growth animals do not breed. Ovulation and spermatogenesis cease during acute infectious disease. Overwork, such as the training of stallions for the turf, causes temporary sterility with no evidence of injury to procreative power later. Nutrition plays an important part. Semiwild cattle generally conceive when the grazing is best. Mere quantity of food does not necessarily give proper nutrition or secure estrum and fertility. Obesity may show the reverse of vigor, though obesity and vigor may coexist. The sterile heifer or cow frequently has irregular lumpy deposits of fat, especially great lumps about the external iliac and ischiatic tuberosities. The hair becomes rough and lusterless. The genitals may be normal save for rather small ovaries. The estrum may be capricious. Impotence in the obese male is due to confinement, high feeding, and lack of exercise. In countries where cattle are habitually worked, like Korea and Japan, the bulls are kept in breeding condition by moderate draft service. Such work prevents viciousness. Some animals will breed although steadily subjected to any or all errors in care and overfeeding. In the breeding male, the proteins are pushed. The relations of vitamins to fertility will be taken up in another paper.

Is it true that *artificial insemination* in cattle can give us data of value? The process is not difficult and there can be no question of its efficacy. It will never be important, Williams thinks. It is chiefly of use in fashionable sires to conserve their strength, but it queers the pedigree. The procedure must approximate the essentials of normal coitus and be used during the one day or one-half day estrum. Moreover, when semen has to be secured after coitus from the vagina of one female in order to be conveyed to that of another, disease may be thus conveyed among animals. Ivanow reports 8000 mares artificially impregnated by his group in Russia.

Further problems, such as the effect of irradiation in stimulating or arresting ovarian activities (on which the committee is furthering animal research); the relative fertility of intergrade or intersex individuals, and vitamin-nutrition experiments, are part of a second paper. The foregoing are samples of urgently needed studies on fer-

tility and sterility that are scattering and unorganized. To secure orderly progress and timely transfers from one science to another, and adequate funds, a forward step is in order. Such a step would be for many or all of the agencies studying sex problems, infrahuman, human, or social, to clear and confer through a stated meeting of representatives, or under some existing organization, or through interlocking directorates, or else one or more liaison officers might be made responsible.

REFERENCES*

- Albrechtsen: Sterility in Cows, Chicago, 1917, Alexander Edger.
 Boyce and Teacher: Contribution to the Study of Early Development of Human Embryo, Glasgow, 1908.
 Corner, Geo. W.: *Physiol. Rev.*, October, 1923, iii, 457; Publ. No. 332, Carnegie Institute, Washington, 75-101.
 Davis, Katharine B.: *Jour. Social Hygiene*, April, 1922, viii, No. 2, 173.
 Dittler: *München. med. Wehnschr.*, 1920, lxvii, 1495; *Ztschr. f. Biol.*, 1920, lii, 72.
 Dublin, Louis I.: Presidential Address, American Statistical Assn., 1924.
 Eckler: *Wien. klin. Wehnschr.*, 1913, xxvi, 1689.
 Frank, R.: *Surg., Gynec. and Obst.*, 1911, xiii, 36; *Arch. f. Gynäk.*, 1912, xevii, 183.
 Gemmil: Quoted by Lillie p. 138.
 Goldschmidt: *Am. Naturalist*, 1915.
 Guyer: *Amer. Naturalist*, iv, 637; *Jour. Exper. Zool.*, 1922, xxxii, 207.
 Halban: *Zentralbl. f. Gynäk.*, June 12, 1915.
 Heape: *Veterinarian*, 1898, lxxi, 202-212.
 Holden, F. C.: *Tr. Am. Gynec. Soc.*, 1919, xlv, 273.
 Kennedy, W. P.: *Quart. Jour. Exper. Physiol.*, 1924, xiv, No. 3, 279-283.
 Kohlbrugge: *Ztschr. f. Morph. u. Anthop.*, 1909-10, xii, 359-368, 1910-11, xiii, 19-30.
 Landsteiner, Karl: *Centralbl. f. Bakteriöl.*, April, 1899, xxv, 546-549.
 Lillie: Problems of fertilization, Univ. Chicago Press, p. 277.
 Loeb, Leo: *Tr. Am. Gynec. Soc.*, 1917, lxii, 172-207; *Am. Jour. Anat.*, November, 1923, xxxii, 3; *Proc. Soc. Exper. Biol. and Med.*, 1910, vii, 90-91.
 Lloyd-Jones, and Hays: *Jour. Exper. Zool.*, 1918, xxv, 463, 497.
 Long, J. A., and Evans, H. M.: The Estrus Cycle in the Rat and its Associated Phenomena, *Memoirs Univ. Calif.*, 1922.
 McCartney, J. L.: *Am. Jour. Physiol.*, January, 1923, lxiii, 209.
 Mall: *Am. Jour. Anat.*, 1918, xxxiii, 397.
 Marshall, F. H. A.: *Physiology of Reproduction*, Longmans, Green, London, ed. 2, 1922.
 Metchnikoff, El: *Ann. de l'Inst. Pasteur*, October, 1899, xiii, 737-769.
 Moore, Carl: *Am. Jour. Anat.*, Nov. 15, 1924, xxxiv, 269-358; *Jour. Exper. Zool.*, July 5, 1921, xxxiii, 365-388.
 Ochsner, Ed. H.: *Surg., Gynec. and Obst.*, November, 1920, p. 497.
 Papanicolaou, Geo. N.: *Proc. Am. Assn. Anatomists*, 1920, xviii, 251.
 Pearson, Lee, and Moore: *Phil. Tr. Series A*, 1899, xcii, 303.
 Pemberton, F. A.: *Surg., Gynec. and Obst.*, August, 1923, xxxix, 207.
 Pryl: *München. med. Wehnschr.*, 1916, lxxxiii, No. 2, 1579.
 Reynolds, E, and Macomber, D.: *New York State Med. Jour.*, 1924, xxiv, 104, 108.
 Rubin, I. C.: *Surg., Gynec. and Obst.*, April, 1917, xxiv, No. 4, 443.
 Siegel, P. W.: *Deutsch. med. Wehnschr.*, 1915, No. 42, 3; *München. med. Wehnschr.*, 61, No. 21, *Zentralbl. f. Gynäk.*, 1921, xlv, 1984.
 Stockard, C. R.: *Am. Jour. Anat.*, 1917, xxii, 225; and *Biol. Bull.*, xxxvii, 222 (with Papanicolaou).
 Ischii, O.: *Biol. Bull.*, 1920, xxxviii, 237; *Anat. Rec.*, 1922, xxxiii, 311-314.
 Triepel: *Anat. Anz.*, 1914-15, xiii, 46 and 48.
 Walstein: *Wien. klin. Wehnschr.*, 1913, xxvi, 1689.
 Williams, W. L.: *Diseases of the Genital Organs in Domestic Animals*, Ithaca, 1921.
 Zangemeister: *Arch. f. Gynäk.*, 1917, cvii, 201.
 Zschokke: Quoted in Albrechtsen.
 Lehmann, F.: *Zentralbl. f. Gynäk.*, 1921, xlv, 647.
 Dickinson, R. L.: *New York Med. Rec.*, March 24, 1906, lxix, 456, 461.

438 WEST ONE HUNDRED SIXTEENTH STREET.

*Marshall gives many bibliographic references, and to this standard volume the reader is referred for general information.

DISCUSSION

DR. JAS. A. CORSCADEN.—In our "Sterility Clinic" we have been interested to find how many women become pregnant. It does not take any elaborate technic, no color index or any other particular laboratory methods, to determine whether your sterility efforts have been successful or whether they have not. The end-result is fairly obvious. All you need is some system whereby the individual so treated will be followed up so that out of 500, 1,000 or 10,000 individuals you will be able to tell how many have become pregnant.

I am afraid we have become reactionary; that is to say, we have come back to the management of the simpler conditions, such as chronic cervicitis, obvious mechanical obstructions, and then we have put in a classification designated either as primary sterility, essential sterility, or whatever name you want to give it—the group of cases in which we cannot find anything wrong,—the tubes are patent, the anatomy is normal, and the male is normal. It is in this type of case that I think animal studies will help out as far as the cystic fluid, etc., may be concerned, coupled with studies of the semen. I am very apt in looking over the records of an operation, to find in only 5 per cent of cases a minute description of the state of the corpus luteum so that an investigator could determine the relationship of the state of the ovary to the dates of the last two or three menstrual periods.

DR. HAROLD BAILEY.—There is a point in Dr. Dickinson's elaboration of this subject that I believe needs some explanation if we compare the spermatozoa of the bull to that of man. If women are more fecund from the sixth to the twelfth day after menstruation starts, and yet ovulate from the fourteenth to the eighteenth day, as most of us believe they do, there is a lapse of from four or five days to a week, which means that the spermatozoon of man retains its vitality that long. If the spermatozoon of the bull lasts but twelve to forty-eight hours, then apparently it cannot be compared to that of man.

DR. GEORGE GRAY WARD.—I would like to ask Dr. Dickinson whether the fact that the woman is menstruating is not an indication that she is ovulating. Dr. Stockard has asked us to join in a clinical study of this subject at the Woman's Hospital. We are to study a series of women every day for three months, taking a daily vaginal smear in order that the changes which occur in the epithelium cyclically just as in the uterine mucosa, may be noted and the exact time of ovulation determined.

DR. ROBERT L. DICKINSON.—I was glad that Dr. Corscaden thought it was wise to organize the various items of these studies because we have the proper people to do them if we can get financial aid, and, because our results are so scanty in the cure of sterility that it is time we did take hold. I am not speaking of the hopelessly gummed-up pelvises that may or may not clear up years later; I am speaking of the simpler causes. We have scant statistics concerning results in attempted cure of sterility, and the claims that are made are often such as those in this new book of Reynolds and Macomber. They affirm that the "majority" of these cases are curable. They advocate (after the husband is proved fertile) anesthetizing every sterile woman to examine her. Then one gathers from the book that most sterile women should have their abdomens opened. "Open closed tubes," say the authors, "and expect success." For years I have been asking Reynolds and Childs to give their actual results. "What proportion of your salpingostomies has resulted in pregnancy?" Childs replied, "I have eleven successful cases." "Out of how many?" "I do not know." Reynolds, year after year at the A. M. A. meetings has brought out only his successes and

has said when his book came out he would tell what proportion of successes he has had.

In the book by Funck-Brentano and Plauchu on the "Treatment of Sterility in Women" (1912), there are figures and figures. The best results claimed, putting all the series together that give figures, are 10 to 12 per cent of successes. Will you open nine abdomens to get one result? And these are the enthusiasts that present these results. Solomon, of Dublin, with his unique claims in *Surgery, Gynecology and Obstetrics* hardly merits serious discussion.

It is really a grievous thing for our special study, that a man who knows as much as Reynolds and has as large experience should open as many abdomens and not keep histories or else not dare to publish failures. He alone could answer Dr. Ward because he has observed a series of unions where husbands with vigorous semen were mated to wives with open tubes and menstruating regularly, yet with ovaries that showed no scars of ovulation on them and no corpora lutea. You know he advocates decapsulation. I know of patients whom his operation failed to relieve.

A book which I would particularly recommend is by Harry H. Laughlin, of Cold Spring Harbor.* He has collected everything that can be said about sterilization, every case reported sterilized in institutions in the United States (3300 in number). The females are one-third of the males. One state of the United States is said (since these figures were collected) to have had 10,000 sterilizations.

There is a rousing in the matter not only concerning the social menace from the progeny of the hopelessly insane and unfit, but the need of a check on the product of the degenerate whose unions reach 7.2 children each. If these people will not carry out simple contraceptive measures we must offer them simple ways of sterilization. It is incumbent upon us to study secure methods of sterilization in the woman now that insufflation is showing that the uterine cornua reopen in no small proportion of cases.

Dr. Ryder raises the question of sterility due to low protein diet. Leo Loeb, years ago, showed that ovulation was influenced by feeding, and Reynolds and Macomber have carried further the study in rats that shows that protein and vitamine X have a very clear-cut influence on fertility in rats.

*Eugenical Sterilization in the United States. Research by the Municipal Court of Chicago.

AN INVESTIGATION INTO THE CAUSATION OF THE ONSET OF LABOR BY PARABIOSIS DURING PREGNANCY*

BY ISIDOR KROSS, M.D., NEW YORK
(*Adjunct Gynecologist, Mt. Sinai Hospital*)

FROM the very beginning of medicine, the inquiring mind has delved into the as yet unsolved problem of childbirth. Today, with all our modern advances, we are as much in the dark regarding the factor responsible for the onset of labor as was Hippocrates.

Many theories have been advanced and stoutly maintained by those professing them, but they have all been proved to be fruitless. Some teach that when the product of conception becomes mature it takes on the properties of a foreign body as a result of decidual degeneration and disappearance of placental septa, and then is expelled.

Others hold that an increase in CO_2 in the uterine blood following thrombosis of the placental vessels is the causative factor (Leopold). Excessive distention of the uterus was considered by some as being the responsible factor, but clinical experience in cases of twins and hydramnios militates against this theory. Increased irritability of the uterus and the influence of menstrual periodicity has likewise been advanced. The pressure of the presenting part on the lower uterine segment and upon the nerve plexus has been held accountable by others, among them Galen. This is equally untenable in that it does not explain the onset of labor in transverse and breech presentation and still less the uterine contractions that come on at the definite termination of gestation in abdominal pregnancies. Another theory holds the essential factor to be the markedly increased irritability of the uterus at this time. This is perfectly true but only restates the condition without explaining it. Of late there has been brought forward the hypothesis that labor is an anaphylactic phenomenon. Up to the present time, this is apparently the most logical theory, and, while not proved, has at least some apparently rational basis for its existence.

In 1910, Sauerbruch and Heyde published their results in a most interesting series of experiments. These experiments were inspired by the publication by Basch of the famous case of the parabiotic Blatscheck sisters. These two sisters were twins of the pygopagus type; the organic union was located in the sacral bones. All the organs were double except the rectum and the introitus which were held in common. When one of these sisters became pregnant, the non-pregnant one was found to have as much milk secretion as the gravid

*Read at the Annual Meeting of the New York State Medical Society, April, 1925.

sister. The nonpregnant sister also developed the same skin pigmentation as was found in the gravid one.

Investigators who have studied the problem of parabiosis have proved definitely that in animals in which this state was reproduced by surgical means there occurred passage of fluids (solutions of potassium iodide and strychnine, etc.) and solids, coloring matter and bacteria from one animal to the other. Sauerbruch and Heyde employed this method of investigation to determine if possible whether substances are produced during labor in the pregnant animal that have any specific effect upon the onset of labor. In their first series of experiments the authors united a nonpregnant animal, in some instances a male, to a second animal well advanced in pregnancy. In two instances labor set in after fourteen days, in five others the interval between operation and the onset of labor varied between five to eight days. In other words, the period preceding labor was sufficient to allow for a satisfactory interchange of fluids between the two animals. During the first few days after operation, nothing of any significance was noted. However, several hours before, a bloody vaginal discharge was noted—this indicating the onset of labor in the pregnant animal—the other animal irrespective of sex became definitely ill. At first a peculiar fatigue was apparent; this gradually became more marked and soon incapacitated the animal. The eyes became swollen, the hair lost its smoothness, and at times there was an escape of urine and feces. The appetite disappeared and the animal did not react to external stimulation. This apathy lasted throughout the period of labor and for some time beyond it. During this period there occurred in most instances convulsions either spontaneous or brought on by external stimulation. The very seriously affected animals died during or shortly after delivery. Those not so seriously affected gradually recovered and in one to eight days were back to their normal status. The animal that was littering showed no ill effects of any kind. It was noticed that the longer the interval of parabiotic union before delivery, the less intensive were the effects upon the nonpregnant animal.

In a second series, two groups of animals (rats) were employed to determine the effect of labor in one animal upon its partner. For this purpose, the animals were so selected that in the one pregnancy was far more advanced than in the other. In every instance, the animal in advanced pregnancy littered live young at the normal time. In two instances the phenomenon of labor had no effect upon the other animal, each of which littered some fourteen days later at the end of their own gestation period. In these two instances the rat in labor produced no ill effects upon its partner. In three other instances, during the delivery of the full term rats, the partners much less advanced in pregnancy had a marked bloody vaginal discharge

and shortly after gave birth to nonviable fetuses. These animals after aborting, rapidly recovered from their exhaustion and remained alive.

Morpurgo explains the illness of the nondelivering animal as due to the sudden lowering of the intraabdominal pressure. This mechanical theory cannot, however, stand because (1) the illness begins before delivery, and (2) the illness is much less marked in those animals where the interval of parabiotic union before delivery is long, and more severe when the interval is short. The nature of the affection points rather to an intoxication. The lack of disturbances in some animals and the varying degrees of intensity in others depend upon the development of an immunity complete in the first and less developed in the others and entirely absent in those animals that succumb. This assumption of immunity is strengthened by the absence of any condition in the pregnant pair similar to that which exists in the nonpregnant partner of the first series of experiments. The author explains the illness of the partners on the ground of protein sensitization which occurs during the period of pregnancy with the sudden invasion of larger quantities of protein during delivery, overwhelming the sensitized animal and producing extreme asthenia, etc.

Von der Heide has formulated the theory which maintains that the onset of labor is really a phenomenon of anaphylaxis. Fetal products enter the maternal system, there setting up antibodies. He calls them labor inducing substances. These increase in quantity towards the termination of gestation, and last throughout the entire period of delivery. He maintains that in all of his patients with weak labor pains, the injection of fetal serum produced successful results.

In investigating this problem, von der Heide employed the serum obtained from the blood of the umbilical cord immediately after the birth of the fetus. The fetal serum from this blood was injected either subcutaneously or intravenously into several groups of patients. In his first group, it was employed to induce labor. He reports six cases in every one of which he succeeded in bringing on labor by the injection of 2 to 17.5 c.c. within a period of time varying from ten minutes to four hours. In a second group of three cases the injection of fetal substance brought on weak irregular labor pains that soon ceased. In a third group the fetal substance was employed intrapartum for weak ineffectual labor pains. In a series of six cases there were five successful results. Group 4 consisted of eight unsuccessful cases. Group 5 received injections of fetal substance intramuscularly without success. Basing his contention on Group 3 the author maintains that fetal substance not only acts primarily in inducing labor pains but also secondarily in strengthening them when weak. A careful analysis of the individual patients cannot but lead to the conclusion that his successful cases simply ran a clinical course that is quite common and that the labor pains after the fetal substance injections were not really due to this substance. In fact all his unsuccessful cases tend to militate against his assumption.

R. Franz maintains the stand that the onset of labor is due to an intoxication set up by protein split products brought on by ferment action upon placental tissue.

Rongy conducted a series of experiments upon nineteen pregnant women using fetal substance according to von der Heide's method. In analyzing these cases, we find that in ten of them (Nos. 3, 5, 7, 8, 9, 11, 12, 14, 16, 17) there was complete failure of any positive action of the fetal substance, and that in the other nine one cannot positively prove that it was the serum that produced the effect because untreated cases very commonly run a similar course.

John A. Kolmer employed pregnant guinea pigs in his study of the effects of serum injection. He divided his animals into several groups, according to the procedure employed.

First Group.—Serum was obtained from three guinea pigs that were about ready to litter. This was injected subcutaneously and intravenously within an hour into five other guinea pigs that were practically at term.

Experiment 1. Pregnant guinea pig, multipara, received 2 c.c. serum subcutaneously. No effect. Passed into normal labor two days later.

Experiment 2. Pregnant guinea pig, multipara, received 1.5 c.c. serum intravenously; no effect. No labor for three days following.

Experiment 9. Pregnant guinea pig, primipara, received 2 c.c. serum intravenously; no effect. Passed into normal labor two days later.

Experiment 15. Pregnant guinea pig, received 1.5 c.c. intravenously; no effect. Labor four days later.

Experiment 17. Pregnant guinea pig, multipara, received 2 c.c. intravenously; no effect. No labor for next forty-eight hours. The serum was obtained by removing the young and the placentae by abdominal section and centrifugalizing the blood.

Second group.—Serum of three mother pigs collected within a few minutes after birth of young.

Experiment 10. Pregnant pig, received 1.2 c.c. serum intravenously; no effect. Labor two days later.

Experiment 13. Pregnant guinea pig, received 1.8 c.c. intravenously; no effect. Labor occurred twenty hours later.

Experiment 14. Pregnant guinea pig, 0.8 c.c. intravenously; no effect. Labor occurred three days later.

Third group.—Serum collected from six pigs removed by abdominal section. Also serum collected from three young pigs immediately after birth.

Experiment 3. Pregnant guinea pig, received 1.3 c.c. serum intravenously; no effect. Labor occurred seventy-two hours later.

Experiment 4. Pregnant guinea pig received 1.4 c.c. serum intravenously; no effect. No labor for next three days.

Experiment 16. Pregnant guinea pig received 2 c.c. serum subcutaneously; no effect. No labor for two days.

Experiment 18. Pregnant guinea pig received 1.8 c.c. intravenously; no effect. No labor for two days.

Fourth group.—Placentae of three animals removed at time of abdominal section. Ground in mortar with sterile saline and centrifugalized.

Experiment 8. Pregnant guinea pig received 2 c.c. of placental extract intravenously; no effect. No labor for three days.

Experiment 5. Pregnant guinea pig, received 1.8 c.c. intravenously. Labor twenty-four hours later.

Experiment 19. Pregnant guinea pig received 2.2 c.c. intravenously. Labor thirty hours later.

Fifth group.—Experiments 6, 7, 17, 20, 21, 22. Five pregnant guinea pigs received intravenous injections of serum from 1 to 2.5 c.c. removed from human placental blood. No immediate effect. Labor occurred one to five days after injection.

In 1912, Dr. Kolmer in cooperation with Dr. D. M. Anspach injected human placental serum into eight patients at or near term. The results in all cases were negative.

Heide's theory that gradual sensitization of the mother by fetal toxins with onset of labor due to sudden intoxication with a large dose of fetal antigen, thus considering labor an anaphylactic process, is not supported by Kolmer's experiments.

Owing to the inconstant and rather unsatisfactory relationship between the conclusions of the various authors and their actual findings, as described in their protocols, the author decided to perform a series of parabiotic experiments and note the effect, if any, that labor had upon pregnant animals.

TECHNIC

Fully mature pregnant rats were employed. An artificial parabiosis (Siamese twins, so to speak) was produced. This was done by making a flank incision through the entire thickness of the abdominal wall, opening into the peritoneal cavity from the last rib above to the pelvis below. A similar incision was made in the second animal on the opposite side. The two animals were now united by the same technic employed in performing an intestinal anastomosis. The peritoneum and muscle were united as one layer, the fascia as a second and the skin as a third. When completed, the two animals possessed a common peritoneal cavity. In every instance the two animals were so selected that the gravidity was distinctly more advanced in the one than it was in the other. Each pair of animals was kept in its own cage.

Parabiotic pair No. 1. Operation January 10, 1924. Moderately advanced gravidity. Right more advanced than left. On January 16, the right rat littered, dropping four young; the left animal was unaffected. On January 22, six days later, the left rat littered, dropping five young. Both animals were quite well. Result negative.

Parabiotic pair No. 3. Operation January 23, 1924. Right more advanced than left. On January 28, there was seen at the line of suture an evisceration of the intestines with gangrene of the gut. Animals were alive,—sacrificed.

Parabiotic pair No. 2. Operation January 21, 1924. Right more advanced than left. On January 24, the right animal was found dead,—intestinal prolapse. Left killed.

Parabiotic pair No. 4. Operation January 24, 1924. Right more advanced pregnancy than left. Right rat littered on January 31, dropping nine young. Left animal littered on February 4, four days later. Result negative.

Parabiotic pair No. 5. Operation January 25, 1924. Right more advanced pregnancy than left. On January 31 the right animal littered, dropping four young. On February 3, three days later, the left animal littered, dropping three young. Result negative.

Parabiotic pair No. 6. Operation January 28, 1924. Right less advanced pregnancy than left. On February 4 the left rat littered. On February 7, three days later, both animals were found dead. Autopsy showed uterus of left animal entirely empty. Lungs showed pneumonia. Right rat had three fully developed fetuses in uterus. Result negative.

Parabiotic pair No. 7. Operation January 29, 1924. Right rat less advanced in pregnancy than left. On February 2, the left rat littered, dropping eight young. On February 6, four days later, the right rat littered, dropping two young. Result negative.

Parabiotic pair No. 8. Operation February 7, 1924. Right animal less advanced pregnancy than left. On February 13, the right rat littered, dropping five young.

On February 18, five days later, the animals were found dead. Autopsy: Right rat, uterus empty, lungs show pneumonia. Left rat, uterus contains four fetuses. Result negative.

Parabiotic pair No. 9. Operation February 7, 1924. Right less advanced pregnancy than left. On February 11, the left rat littered, dropping six young. On February 13, two days later, the right rat littered. Result negative.

Parabiotic pair No. 10. Operation February 11, 1924. Right less advanced pregnancy than left. On February 16, both animals were found to have littered.

Parabiotic pair No. 11. Operation February 12, 1924. Right less advanced pregnancy than left. On February 15, the left rat littered, dropping four young. On February 18, three days later, the right rat littered, one young. Result negative.

SUMMARY

Eleven pairs of pregnant rats were united in parabiosis. Pairs No. 2 and No. 3 died before the animals went into labor. Of the remaining nine pairs, all except No. 10 went into labor at the usual time at the termination of their respective periods of gestation. The animal less advanced in pregnancy continued to the end of its normal gestation period without being in the slightest degree affected by the labor of its partner. In pair No. 10, both animals littered at approximately the same time.

In view of the normally completed course of gestation in the other eight pairs, it would be a rather illogical assumption to explain this solitary instance on the basis of an anaphylactic phenomenon as Sauerbruch and Heyde, von der Heide, and Rongy, have assumed. It is much more likely that the stage of gestation in both animals was about the same and that the somewhat enlarged size of the fetuses in the left rat was due simply to the fact that in that breed of animals the size of the young was larger because of the smaller number of fetuses.

CONCLUSION

Fascinating as is the theory of labor as an anaphylactic phenomenon, and logical as are the theoretic assumptions made in its behalf, the results of these experiments have shown that in the rats employed, no labor inducing substances are produced during labor that have any appreciable influence upon the course of pregnancy in the partner of a parabiotic pregnant pair.

REFERENCES

- Sauerbruch and Heyde: *München. med. Wehnschr.*, 1910, lvii, 2617.
Basch: *Deutsch. med. Wehnschr.*, May 16, 1910, p. 987.
Morpurgo: *Verhandl. d. deutsch. path. Gesellsch.*, 1909, xiii, 150.
Heide, von der: *München. med. Wehnschr.*, 1911, lviii, 1705.
Franz: *München. med. Wehnschr.*, 1912, lix, 1702.
Rongy: *Am. J. Obst.*, 1912, xvi, 1.
Kolmer: *Jour. Med. Research*, 1914, xxix, 425.

NOTES ON THE ETIOLOGY AND EPIDEMIOLOGY OF IMPETIGO CONTAGIOSA NEONATORUM*

BY DAVID L. BELDING, M.D., BOSTON, MASS.

IMPETIGO contagiosa neonatorum, an infectious skin disease in newly born infants, presents a serious problem in maternity hospitals. Its ease of transmission and, at times, its high mortality, make the disease dreaded by obstetricians. Reports from all parts of the world testify to the wide distribution of this infectious disease. Because of its varied symptoms, it has been described under a variety of names, such as pemphigus neonatorum, pemphigoid, dermatitis exfoliativa, and impetigo contagiosa bullosa.

Three epidemics have been observed in the Robinson Memorial Hospital, Boston, during the past eight years. The first necessitated the closing of the hospital, the second was less severe, and the third extremely mild. In the second epidemic the etiologic and epidemiologic studies which are described in this paper were made. Owing to the excellent reviews of a somewhat voluminous literature, by several recent investigators, the scope of this paper is confined to our particular observations, and only those references are cited which bear directly on the points at issue.

CLINICAL SYMPTOMS

The disease is characterized by vesicle and bleb formation and at times by an exfoliation of the upper layer of the epidermis. In susceptible cases its rapid progress through the formation of new lesions, and the peripheral extension of old, may produce a dermatitis exfoliativa neonatorum.

The first lesion appears as a small vesicle with a slightly inflamed or hyperemic base, most frequently on the exposed surfaces, such as the head and hands, later extending to the moist opposing skin surfaces, as neck, axilla, or groin. In some instances the ruptured or unruptured vesicle heals without extension and with little or no crusting; in others, it extends peripherally until a large bleb is formed. The fluid at first is clear, but later becomes turbid. The skin is at first tense, then flaccid, and finally ruptures. In fatal cases large areas of denuded skin similar to burns result from the extension or the coalescence of several bullae. If the process does not advance too rapidly, various stages of skin regeneration may be found.

All grades of skin involvement occur in the same epidemic, ranging from mild, questionable lesions to severe exfoliation. The proportion

*Contributions from the Evans Memorial. No. C24, Series 102.

of mild and severe cases varies with the epidemic, indicating a difference in the virulence of the infecting organism. In the malignant cases the diagnosis is indicated by the rapid progress, autoinoculability, bleb formation, and exfoliative lesions. The mild type is characterized by the formation of small vesicles which later become pustular, usually heal promptly without scarring, and show little tendency to peripheral extension. Of seventeen patients, three showed the bullous spreading type; seven, a combination of the vesicular and bullous, and seven, the vesicular alone with isolated or grouped lesions. The appearance of the disease ranged from the first to the ninth day after birth, appearing from the third to the fifth day in two-thirds of the patients. Most of the cases recorded by three investigators occurred between the fourth and seventh days.

The infant, except for the discomfort resulting from the loss of skin, at first evidences no constitutional symptoms. In the fatal cases a general septic condition with subnormal temperature, due to toxic absorption and faulty elimination from the denuded skin areas, rapidly develops shortly before death. The prognosis depends upon the extent and rapidity of the exfoliation and the general resistance of the infant. Postmortem findings, as a rule, give little information.

ETIOLOGY

Cultures.—Although the adult form of impetigo has been attributed to a variety of organisms, most investigators believe that the streptococcus is the primary agent in the vesicular type of Tisbury Fox and that the staphylococcus is a secondary invader; whereas, the pustular type of Bockhart is due to the staphylococcus. According to three investigators, pure cultures of streptococci isolated from impetigo vesicles have produced typical lesions of the disease in man, but serologic and cultural studies of such streptococci by four investigators indicate no uniformity in the strains. It would appear that the causative agent of the adult type of impetigo contagiosa is a skin streptococcus of exalted virulence.

With the exception of the bullous type of adult impetigo, the disease in infants seems clinically and etiologically different. At least eighteen investigators have concluded that the *Staphylococcus aureus* is the invading organism in the impetigo of infants.

In our three epidemics, the prevailing organism was *Staphylococcus aureus*. The *Staphylococcus albus*, a Gram-positive bacillus, and a hemolytic streptococcus were occasionally found. No pathogenicity was observed in skin inoculations except with the *Staphylococcus aureus* and the hemolytic streptococcus, and variations were noted in the different strains of *Staphylococcus aureus*. The particular strain described in this paper was isolated in the second epidemic. The chief difficulty was to obtain cultures uncontaminated with skin staphylo-

cocci. Aerobic and anaerobic methods with a large assortment of general and special media were used. From a review of the literature and from our observation in a more restricted field, it is evident that the impetigo strain differs from the ordinary *Staphylococcus aureus* in its pathogenic action and that this pathogenicity varies in the different epidemics.

No gross cultural differences between the impetigo staphylococcus and the ordinary *Staphylococcus aureus* could be determined. The fermentation reactions of a strain from an infant with impetigo which produced lesions of the disease, and from another which did not cause such lesions were practically the same. Acid developed in glucose, lactose, saccharose, maltose, levulose, and mannite, but not in raffinose, salicin, and inulin for both strains, a greater amount being produced in glucose and lactose than in the other sugars. However, a difference was noticed in the rate of acid production, the nonimpetigo strain showing an initial "lag" for the first twenty-four hours.

Animal Inoculations.—In nearly every instance attempts to reproduce the disease in the skin of animals have proved a failure. Clegg and Wherry¹ observed no reactions beyond a slight hyperemia from small subcutaneous and intraperitoneal injections in guinea pigs. Falls,² using larger doses, was able to produce death in guinea pigs with visceral pyemia and with edema and hemorrhage of the subcutaneous tissues, but intravenous administration showed no selectivity for the skin and intradermal injections in a monkey did not produce typical lesions. Smith and Burky³ were not able to produce lesions in the skin and cornea of rabbits with staphylococci isolated from lesions of impetigo contagiosa in children. However, Landsteiner, Levaditi, and Praser⁴ produced pemphigoid lesions in chimpanzees. Our intradermal injections and cutaneous inoculations with six strains of *Staphylococcus aureus*, a hemolytic streptococcus, and a Gram-positive bacillus, beyond causing an occasional slight redness and scaling, did not produce typical lesions in guinea pigs and rabbits. Subcutaneous injections of small doses gave only a slight edematous inflammation in these animals.

Human Inoculation.—In one infant a hemolytic streptococcus and a *Staphylococcus aureus* were isolated, from an apparently unbroken vesicle. Cutaneous inoculations were made in another portion of the body with pure cultures of these two organisms. The staphylococcus produced a more typical and a considerably larger lesion, which in forty-eight hours appeared as a slightly indurated red area, 18 mm. in diameter, while the streptococcus inoculation gave only a small 5 mm. zone of redness with no induration, and the control merely showed a faint flush. At the end of ninety-six hours the former showed an area of denuded skin, 12 mm. in diameter, with an elevated ragged border; and the latter, a smaller area of redness and a small broken

vesicle, 3 mm. in diameter, while the control remained as before. Either lesion might represent one of the varied forms of the disease, but the staphylococcic inoculation resembled the spreading bullous type prevalent in this particular infant.

This test, for obvious reasons limited to the autoinoculation of bacteria obtained from the same infant, is open to the criticism that infection from other lesions may have occurred in the inoculated areas. The absence of any demonstrable lesion in the control inoculation and the difference between the lesions produced by the staphylococcus and the streptococcus argue against this possibility. While this test does not determine the primary cause of infection, it demonstrates that, at least in this instance, the staphylococcus was capable of producing a more rapidly progressing lesion of the bullous type than the streptococcus.

The same strain of staphylococcus was inoculated cutaneously in the forearm of an adult. In six hours a diffuse redness, 55 mm. in diameter, with a slightly indurated central portion, and an enlarged axillary gland were observed. In fifteen hours the indurated area had extended to a diameter of 55 mm., with an area of more intense redness in the vicinity of the inoculation. In forty hours the induration had subsided, but a diffuse redness persisted over an area 75 mm. in diameter. In sixty hours the induration and redness had subsided except for a slight redness at the point of inoculation. In ninety hours a less marked but similar condition was found. No vesicle formation was observed, but a slight crusting was noticed. The lesion was not typical of either the vesicular or bullous types of impetigo, but seemed to be characterized by an erythematous induration of the skin with intense itching.

Almquist⁵ produced a vesicular lesion by inoculation with the impetigo staphylococcus. Clegg and Wherry produced a vesicular lesion on the arm in thirty hours which underwent resolution in forty-eight hours. Falls, by inoculating pricked skin with a broth culture, obtained, in twenty hours, a distinct vesicle from which he recovered the *Staphylococcus aureus*. Landsteiner, Levaditi, and Praser likewise produced vesicular lesions.

Discussion.—Evidence collected from many sources points to a different etiologic agent in the vesicular impetigo of children and of adults and the bullous impetigo of infants. No one has been able to demonstrate the etiologic relationship of the streptococcus to infant impetigo as has been done in the case of adult impetigo contagiosa, and there is an almost unanimous belief that the *Staphylococcus aureus* is the cause. The etiologic relationship of the staphylococcus in the adult form of the disease has been demonstrated by four investigators through the production of typical lesions instead of the ordinary furuncle or carbuncle infection. While the possibility of a

filtrable virus or a symbiotic relationship cannot be ruled out, the accumulated evidence seems sufficient to designate a special strain of *Staphylococcus aureus* as the causative agent.

Evidence indicates that the impetigo staphylococcus, except for minor cultural peculiarities, differs from the ordinary *Staphylococcus aureus* only in its pathogenic characteristics, and that differences exist even in the pathogenic powers of the various impetigo strains. The varied clinical symptoms, epidemic peculiarities, and differences in pathogenicity are due in part to the virulence of the infecting strains. The different symptoms in adults who have contracted the disease from infants may be explained by a difference in skin resistance, the skin of the newborn infant offering a more suitable culture medium.

In general, our findings have confirmed the work of other observers. Lesions of the disease could not be produced in animals. The typical vesicular lesion following the inoculation of the skin of an adult, described by others, was not obtained, but a skin reaction differing from the usual type of staphylococcic infection was produced. With the same organism in an infant, the peripherally spreading bullous lesions of the disease were reproduced; whereas, under similar conditions in the same patient, a hemolytic streptococcus, isolated from an impetigo lesion, produced an atypical lesion. In this somewhat limited way the comparative rôle of the staphylococcus and streptococcus as etiologic agents in infant impetigo is compared for the first time. Although the last word has not yet been said upon the etiology of infant impetigo, all the evidence up to the present time tends to designate certain strains of *Staphylococcus aureus* of variable virulence as the etiologic agents in infant impetigo.

EPIDEMIOLOGY

Hospital.—For the purpose of determining the circumstances favorable or unfavorable to its spread, the progress of an epidemic was followed in a hospital with excellent facilities for handling the disease. The epidemic was confined to two of the three floors occupied by maternity patients. Each floor was a complete unit as regards operating, sterilizing, and delivery rooms, nursery, isolation room, and diet kitchen, with the exception that the water bottles and special food for all infants were prepared in the same kitchen. The first floor infected had three wards of seven beds, four of two and three, and two single rooms. The second comprised four large wards of nine to twelve beds and one single room.

The nursery on each floor consisted of two rooms in which metal baskets containing the infants were arranged in racks according to wards. Only the obstetrical staff and the nurses assigned to the nursery were permitted to enter these rooms. Common supplies were

used in caring for all infants. The babies were wheeled in groups to the wards for nursing. The linen was handled by the hospital laundry.

Isolation methods were established early in this epidemic. The technic employed in handling contagious diseases was enforced. The diseased and suspected infants were isolated separately under special nurses, and even those with febrile symptoms were segregated. Each infected infant was treated as a separate unit with sterile precautions. As far as possible, isolation measures were used in caring for the mothers of the infected babies.

Course.—The epidemic spread in spite of prompt isolation measures, indicating either delay and faulty technic or transmission by carriers. The original source of the infection was not determined. The disease first appeared as a pustular eruption on the face and neck of a two-day-old child. The second case, which developed two days later, showed similar but more extensive lesions, while the third case, developed into a fatal dermatitis exfoliativa neonatorum. The skin lesions varied from mild pustules to extensive exfoliation, a fact which rendered difficult the differential diagnosis between the mild form of impetigo and nonimpetiginous eruptions.

The epidemic lasted thirty-four days. The first four cases developed on the first floor, and the fifth case appeared on the second floor on the twelfth day. The epidemic on the first floor was most severe between the fourteenth and twenty-first days, and that on the second floor, between the eighteenth and twenty-fifth days. If we eliminate two infants with questionable diagnoses, the epidemic was confined to three wards on the first and two wards on the second floor. The incubation period was brief. The shortest interval between cases on the second floor was two days and the longest six, but on the first floor there was one interval of thirteen days which suggests transmission through carriers. The tendency of the skin to macerate during the warm weather tends to give a summer prevalence to these epidemics.

Morbidity.—The leading characteristics of this disease are the rapidity of transmission, the clinical progress, and the susceptibility of infants. During the period of thirty-four days, 17, or 8.5 per cent of a total of 202 infants became infected. Since the disease did not appear upon the second floor until twelve days after its appearance on the first, only 153 infants were actually exposed to the disease, thus increasing the morbidity to 11.1 per cent. However, since the distribution of the disease left certain wards unaffected, 75 cases were directly exposed, giving an actual morbidity of 22.7 per cent. Exact statistics of the morbidity rate in the various epidemics are rarely cited in the literature, but the impression of great variation is given. The average is probably between 20 and 30 per cent.

Mortality.—The mortality reported by fifteen investigators averages 21 per cent, and ranges from 0 to 50 per cent. Of the 17 patients in our second epidemic 2, or 11.8 per cent died. In our first epidemic the mortality was about 25 per cent, and in our third no deaths occurred.

Human Carriers.—Circumstantial evidence points to human carriers as the chief source of infection. The ease of surface infection and the hardy nature of the staphylococcus render the disease readily transmittible by direct contact and through true or mechanical carriers. The possible sources of human transmission are: (1) the diseased infant, (2) the mother, (3) the physician, and (4) the nurse.

Direct contact of infected and well infants may have taken place in our nursery previous to the appearance of clinical signs of the disease. The restriction of the disease to certain wards would favor either this assumption or indicate transmission through the nurse.

Certain investigators believe that the mother is the source of the disease. A mother with staphylococcic impetigo, a systemic staphylococcic infection, or even with an infected breast might be the initial cause of an epidemic, but such a carrier, through immediate isolation, could be rendered incapable of serving as a source of further transmission. Recently Mellon, Caldwell, and Winans⁶ have demonstrated that mother's milk may be the source of an epidemic. Cultures of *Staphylococcus aureus* were obtained in milk from both the peripheral ducts and the deeper recesses of the breast in apparently symptomless mothers of infants with impetigo. None were obtained from mothers of uninfected children. Their findings emphasize the importance of isolating the mothers of infected infants. In nearly every epidemic a few mothers have been infected from the infant. In this particular epidemic, one mother developed an impetigo of the breast from the nursing infant.

In the older writings, the attendant at the delivery was considered the source of transmission, several investigators reporting epidemics traceable to midwives. In this epidemic no evidence was obtained that the obstetrician or delivery room attendants were responsible for the spread of the infection. The varied interval after birth would tend to eliminate this source.

The principal source of human transmission is the nurse. In the nursery she is in constant, intimate contact with the infants and serves as a means of mechanical transmission even if not a true carrier. Although in the epidemic under discussion suspected infants were immediately isolated, transmission through this source had been already accomplished. The outbreak of the epidemic on the second floor twelve days after that on the first floor followed closely the transfer of a nursery nurse from the first to the second floor. Secondary in-

fection of the hands and arms of nurses from infants has been observed in other epidemics.

Inanimate Objects.—The vitality of the staphylococcus, and its normal habitat on the skin and upon inanimate objects, render easy the transmission of the disease and permit inanimate objects to play a more important rôle in its distribution than in that of most communicable diseases. When the infants entered the ward for nursing, they were exposed only to the environment of their respective mothers. Unless an infected mother, in whom the disease had escaped recognition, was able to contaminate directly or indirectly other mothers, the ward offered comparatively little chance for this means of transmission. At nursing time several infants were removed from their baskets and wheeled on a carriage to the ward, thus affording opportunity for personal contact and contamination of the carriage coverings.

The clothing and bedding of the infants were laundered with no special measures for sterilizing, since the process in itself should be sufficient to destroy the staphylococcus. The final handling of the linen by laundry attendants was a possible, though improbable, source of infection. The water bottles and formula feedings were prepared in one place for the entire service, but as sterile precautions were used and most infants were breast-fed, this source was unlikely.

The utensils for handling the infants in the nursery, such as bathing tables, basins, oil, dressings, etc., presented the most favorable opportunity for the transfer of infection by inanimate objects. The labor of caring for from thirty to forty children was so great that routine sterile precautions among the infants were impossible, and under the pressure of rush work, the transfer of infection both through the nurse and through nursery material might readily occur. The wide distribution of ordinary staphylococci rendered practically impossible any bacterial determination of the inanimate sources of infection.

Discussion.—The causative agent, the staphylococcus, is a hardy organism capable of leading for long periods a saprophytic existence on resistant skin and upon inanimate objects. Owing to lack of resistance, the skin of the newly born infant presents a fertile soil. In bacterial cultures a few organisms will develop on favorable media, whereas, the implantation of many thousand times that number are required for a less favorable media. A similar comparison in respect to the ease of and reaction to infection with the impetigo staphylococci may be made between the skins of the infant and the adult. With such favorable conditions for infection in the infant, many means of transmission of this viable organism are afforded.

Human agency appears the most frequent source of transmission. The primary source may be a mother who is a carrier. Our evidence points to the spread of the infection in the nursery directly or indirectly through the nurse, who acts chiefly as a mechanical carrier.

The spread of the epidemic from the first to the second floor nursery followed the transfer of a nurse. The possibility of true carriers among the nurses or attendants must always be considered, but their detection is most difficult.

An object which comes in contact with the lesions furnishes a means of transmitting infection to healthy infants. The common utensils used in the daily care of the infants afford the most likely sources. No evidence is found to indicate the transmission through prepared food, water, or freshly laundered clothing.

Since the resistance of the infants, except for racial and individual variation, should prove the same, our observations and those of others indicate a marked difference in virulence in the strains of the infecting organism. The first epidemic in our hospital showed an extremely rapid spread, a devastating clinical picture, a high mortality, and necessitated the closing of the hospital. The second proved of a less virulent type, while the third showed a mild, yet typically clinical form of the disease with no fatalities.

Prevention.—The institution of prophylactic measures depends upon the facilities of the hospital as regards equipment and nurses. The rapid isolation of diagnosed and suspected cases in two groups with special nurses is the ideal method. Practically, limited facilities may necessitate the isolation of suspected and diagnosed cases in one group. The special nurses employed in the care of the infected infants should have no direct or indirect contact with other nurses. Frequent inspection of well infants should be made to guarantee the prompt isolation of all suspects. If the disease persists in spite of isolation measures, no new patients should be received unless complete separation from the old patients is possible.

After the disease has broken out, the primary prophylactic measure is the proper handling of the healthy rather than the care of the infected infants. A thorough cleansing and disinfection of the nursery should precede the individual handling of the infants, since the staphylococcus is capable of transmission through various objects, and it may be widely distributed before the disease is recognized. With the possibility of new cases continually appearing, each healthy infant should be handled, in so far as possible, as a separate unit, especially as regards the common nursery supplies. Theoretically, the ideal method would be the use of the same precautions as in handling patients with infectious diseases. Practically, scarcity of labor renders such a procedure impossible in most hospitals and only the more important precautions, such as cleansing and sterilizing the gloved hands of the nurse before handling each infant, and the avoidance of contact with the same materials by the different infants can be followed.

In order to eliminate a possible source of infection, the mothers of infected infants should be isolated. The question of breast or artificial

feeding depends upon the individual case. When a special isolation ward is not available, contagious disease precautions for each mother should be maintained. The care of the infected infants, especially if suspected cases are not separately isolated, should follow the same precautions as outlined for the well infants. Each infant should be handled with full contagious disease precautions. All linen from the infected nursery should be sterilized before it is sent to the laundry. Bottles used for infected babies' food and drink should be sterilized and prepared separately from the regular supply.

SUMMARY

1. Our observations corroborate the opinion of the previous investigators who find that a strain of *Staphylococcus aureus* of special virulence is the etiologic agent in impetigo contagiosa neonatorum.

2. A pure culture of *Staphylococcus aureus* isolated from an impetigo lesion failed to produce skin lesions in guinea pigs and rabbits. The same culture caused a nonvesicular inflammatory reaction in the skin of an adult and a typical exfoliating lesion in an infant from whom the organism was originally isolated. A hemolytic streptococcus isolated from the same infant produced only a small atypical lesion.

3. The cultural characteristics of the impetigo staphylococcus are practically the same as those of the ordinary staphylococcus. A questionable minor difference in the rate of carbohydrate fermentation is recorded.

4. The viability of the staphylococcus makes the disease transmissible through both human beings and inanimate objects, and renders disinfection of an infected hospital especially difficult. In the epidemics under observation it is probable that the transmission of the disease occurred chiefly through the nurses and the nursery supplies.

5. The variation in the different epidemics is due probably to a difference in the virulence of the infecting strain. The difference in clinical symptoms between adults and children or in individual infants seems to be due to the resistance of the host.

6. The primary prophylactic measure in a hospital epidemic is the individual handling of the well infants, as early cases are capable of transmitting the infection before a diagnosis is made.

REFERENCES

- ¹Clegg, M. T., and Wherry, W. B.: Jour. Infect. Dis., 1906, iii, 165.
- ²Falls, F. H.: Jour. Infect. Dis., 1917, xx, 86.
- ³Smith, T., and Burky, E. L.: Bull. Johns Hopkins Hosp., 1924, xxxv, 78.
- ⁴Landsteiner, K., Levaditi, C., and Praser, E.: Compt. rend. soc. de biol., 1911, lxx, 643, 1026.
- ⁵Almquist, E.: Ztschr. f. Hyg. u. Infektionskrankh., 1891, x, 253.
- ⁶Mellon, R. R., Caldwell, D., and Winans, W. W.: Am. Jour. Med. Sc., 1925, clix, 419.

ELIMINATION OF THE SECOND STAGE OF LABOR IN BREECH PRESENTATIONS

BY FREDERICK C. IRVING, M.D., AND THOS. R. GOETHALS, M.D.,
BOSTON, MASS.

(From the Department of Obstetrics, Harvard Medical School)

IT is a recognized fact that breech presentations offer a relatively unfavorable prognosis for the baby. Statistics from various sources give the fetal mortality as 6, 10, 15, or even 20 per cent, the last, quoted by Hirst, to include badly managed cases in general practice. Recent statistics from the Sloan Maternity Hospital show a mortality at that clinic of 12 per cent in primary breech presentations. De Lee, who gives 6 to 15 per cent as a general mortality figure, believes that this should not exceed 5 per cent in uncomplicated cases.

Several factors are contributory to natal and neonatal deaths in breech deliveries. Violence and trauma of unphysiologic extraction are considered as outstanding causes by Crothers, an opinion in which he is supported by Pierson. These observers believe that injury to the vital centers in the medulla is the usual cause of death in stillborn viable fetuses, and that the occurrence of such injury is favored in breech presentations by traction on the body or by suprapubic pressure on the aftercoming head.

Other factors, however, are present in breech presentations which render them more dangerous to the fetus than vertex presentations. Most important is disproportion between the baby and the maternal pelvis. If such disproportion is suspected the obstetrician finds that several very valuable methods of comparison between baby and pelvis, which are of the greatest importance when the vertex presents, are unavailable. Under the circumstances the engagement of the head before labor and Müller's method of impression are obviously out of the question, and even a test of labor will give no clue as to the probability of the baby's head passing uninjured through the pelvis. Consequently the only means of prognostication are reduced to measurement of the pelvis and estimation of the size of the baby at term, of which only the former is an accurate determination. This means that regardless of the progress of labor, or the skill and gentleness of extraction, a certain proportion of babies must be lost as a result of mechanical difficulties in delivery of the aftercoming head, which has had no opportunity to become moulded into the pelvis during labor, and the size of which, relative to the pelvis through which it must eventually pass, can never be accurately ascertained until the act of delivery is in its final stages. Cases of marked disproportion discov-

ered in this way must necessarily carry a high fetal mortality without regard to whether the death of the child is due to asphyxia or to the trauma of extraction. For the same reason accouchement forcé in breech presentation is apt to result in mechanical difficulty in delivery of the aftercoming head with a consequent bad risk for the baby.

Aside from the danger element of disproportion, presentation of the breech results disadvantageously to the fetus in several respects. In the first stage, the relative lack of accommodation of the breech to the birth canal favors premature rupture of the membranes, and does not afford a mechanically sufficient dilator of the os. The result is a

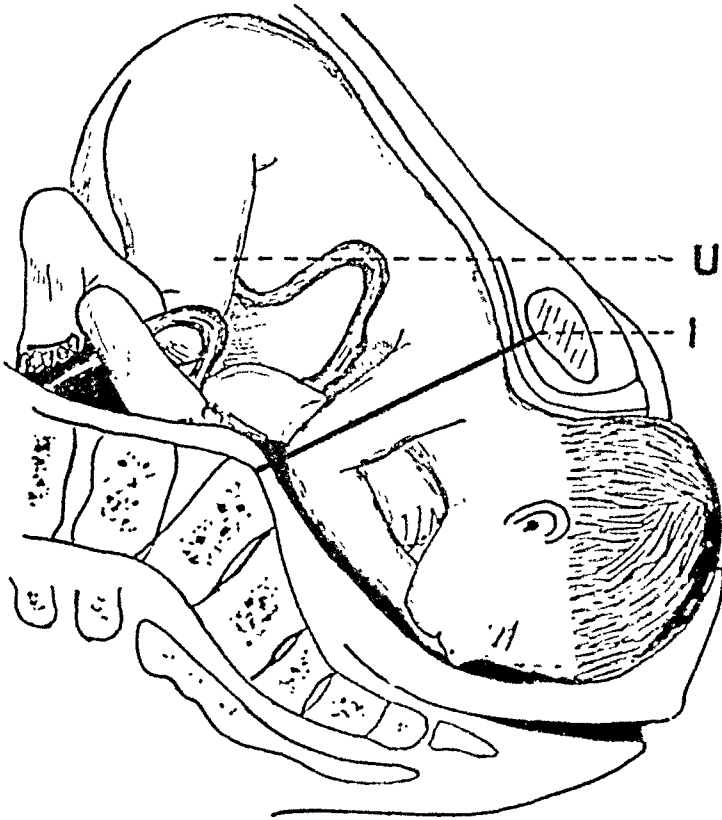


Fig. 1.—Demonstrating that in a vertex presentation which is on the perineum, the umbilicus (*U*) of the fetus is still well above the superior strait (*I*), consequently the umbilical cord is less likely to be subjected to pressure than in a breech presentation which has descended to a like degree.

tendency for such cases to undergo a long and tedious first stage, and in many instances to delay the actual onset of labor for some time after the membranes have ruptured.

Figs. 1 and 2 illustrate another factor which renders the breech presentation more dangerous to the child than the occipital. As a general rule many breeches remain high above the pelvic brim or but lightly engaged until full dilatation of the os has occurred; as soon, however, as this barrier is out of the way, descent ensues. In this process the cord may be compressed either between the breech and the pelvic brim or between the thigh and the body of the fetus. The

fact, above mentioned, of the poor accommodation of the breech to the shape of the birth canal favors such compression by allowing the cord not infrequently to prolapse partially or completely. Needless to say such compression can always be suspected and eventually proved, if careful watch of the fetal heart is kept at all times, especially during the second stage.

Another danger to the baby during the second stage lies in the tendency of the uterus to empty itself of the greater bulk of its contents, viz., the legs, body, and arms of the fetus, shortly after full dilatation has occurred. The result of this sudden shutting down of the uterus upon the relatively small bulk of the head occasionally causes a rapid

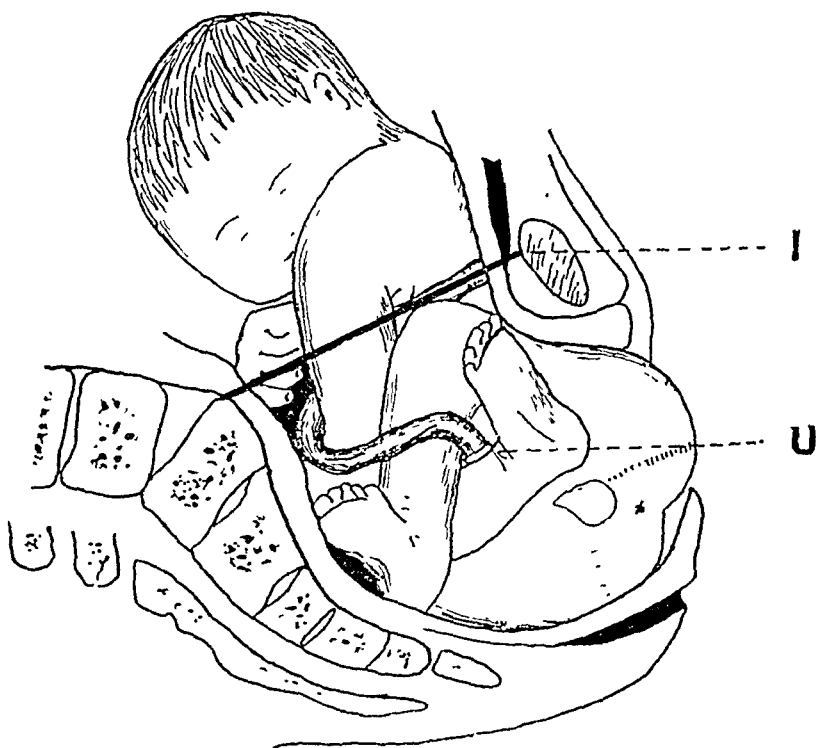


Fig. 2.—Demonstrating that in a breech presentation which is on the perineum, the umbilicus (U) of the fetus is well below the superior strait (I). Thus the umbilical cord may easily be subjected to pressure and asphyxia result. Hence, the inadvisability of delay in delivery, once the breech has reached the pelvic floor, is apparent.

and complete detachment of the placenta with consequently speedy death of the baby from asphyxia unless the situation is met with immediate extraction.

Finally, the baby is jeopardized during actual expulsion from the vagina. For years it has been accepted that death from asphyxia is almost inevitable if the head be not delivered within eight minutes after the appearance of the umbilicus at the vulva. Although this view is challenged by Pierson and others, and although it may not be quantitatively applicable for all cases, it ought to be taken to mean that delivery should be completed intelligently and gently and as rapidly as possible after the umbilicus appears, rather than leave the

case to nature. It is the exception rather than the rule to find the cord pulsating when the umbilicus appears, because at this stage the cord is usually compressed between the baby's head and the pelvic brim; therefore, eventually and relatively soon, the baby is certain to perish unless an airway is established and the lungs given opportunity to function.

A study of fetal mortality in primary breech presentation as shown by the records of the Boston Lying-In Hospital for the ten year period from 1914 to 1923 inclusive is one of the main objects of this paper; the other is to summarize the conclusions to be drawn from one year of special assignment work on the subject of breech deliveries. The figures to be presented are derived from the deliveries of single viable babies presenting as primary breeches, uncomplicated by incidental conditions which in themselves tend to a high fetal mortality, e.g., placenta previa; they exclude natal and neonatal deaths from such causes as maceration, nonviability, prematurity, and congenital anomalies incompatible with life or continuance of life. They also exclude breech deliveries in multiple pregnancy.

The ten year series yields 235 primary breech deliveries with 23 deaths, a mortality rate of 9.78 per cent. These are divided between 94 primiparous deliveries with 12 deaths, a 12.7 per cent mortality, and 141 multiparous deliveries with 11 deaths, a rate of 7.8 per cent. The figures are given in Table I.

TABLE I
DELIVERIES AND DEATHS

YEAR	PRIMIPAROUS			MULTIPAROUS			TOTAL		
	DELIV- ERIES	DEATHS	PER CENT	DELIV- ERIES	DEATHS	PER CENT	DELIV- ERIES	DEATHS	PER CENT
1914	9	2	22.2	7	0	0	16	2	12.5
1915	12	1	8.3	6	2	33.3	18	3	16.6
1916	8	1	12.5	19	0	0	27	1	3.7
1917	11	0	0	15	1	6.6	26	1	3.8
1918	8	1	12.5	11	1	9.1	19	2	10.5
1919	6	0	0	15	2	13.3	21	2	9.5
1920	6	3	50.	17	3	17.6	23	6	26.
1921	12	1	8.3	16	1	6.2	28	2	7.1
1922	9	0	0	17	0	0	26	0	0
1923	13	3	23.	18	1	5.5	31	4	12.9
Totals	94	12	12.7	141	11	7.8	235	23	9.78

The 23 natal and neonatal deaths may be classified as follows:

Group A. Mechanically easy delivery with neonatal death from intracranial hemorrhage.

Group B. Mechanically easy delivery with resulting stillbirth, or birth of a child in very poor condition with ensuing exitus.

Group C. Mechanically difficult delivery.

Group A includes six cases in which delivery was described in the records as being easy of accomplishment, but following which the

babies died after several hours or days, with clinical signs of intracranial hemorrhage; in two of these cases the diagnosis was confirmed at operation; in one, at autopsy. Cases in this group may well be compared to those children born by a normal spontaneous vertex delivery who die occasionally in a similar manner hours or days after birth.

Group B includes those babies born spontaneously by the breech or by extraction where no mechanical obstruction or difficulty existed, but who were either stillborn or born in such poor condition that attempts at resuscitation were fruitless. These cases, viewed together, are very instructive, and justify a summary. They are eight in number.

No. 21702.—Para ii. Labor was induced with castor oil and quinine. No record of fetal heart sounds for some hours before delivery, although it was present at time of rupture of membranes. The patient was unruly and pushed breech out of vulva before arrival of house officer. She was scrubbed and delivered at once without difficulty. The baby weighed six pounds and six ounces. Stillborn.

No. 25307.—Para ii (essentially primipara). Flat pelvis. Fetal heart was heard at 140 and regular, forty minutes before delivery. Breech on perineum. Easy extraction. Baby weighed six pounds, eleven ounces. Child rigid, gasped once, and grew pallid; resuscitation unsuccessful.

No. 26523.—Primipara, forty-one years old. Toxemic. Bag inserted. Breech allowed to crown after full dilatation. Fetal heart 140, regular, forty-two minutes before delivery. Easy extraction after crowning. Baby stillborn.

No. 25821.—Para iii. First delivery by cesarean section; second by version. Patient allowed to go into labor. Fully dilated for over an hour. Fetal heart fell to 90 and became irregular. High breech. Easy extraction of a nine pound child which could not be resuscitated.

No. 26867.—Para iv. Justo minor pelvis. Ruptured membranes five hours before labor started. Fetal heart sounds recorded at intervals until twenty-two minutes before delivery. Breech presenting, delivered; cord found compressed and caught by left leg; freed; did not pulsate. Immediate delivery. Stillborn.

No. 26899.—Para v. Normal pelvis. Ruptured membranes twenty-four hours before onset of labor. Fetal heart irregular from the start,—80 to 180. Bag inserted, came out in two hours and a quarter. Os found fully dilated. Extraction easy within five minutes and a half of grasping foot. Stillborn.

No. 26972.—Primipara. Slightly funnel-shaped pelvis. Pushed frank breech to perineum. Fetal heart heard seventeen minutes before delivery. With breech on perineum, fetal heart sound was suddenly lost. Immediate extraction. Baby pallid, and could not be resuscitated. Placenta fell out on top of baby.

No. 27074.—Para v. Under antiluetic treatment. Normal pelvis. Fetal heart heard on admission, could not be heard an hour later. Prepared for immediate delivery. Breech on perineum. Easy extraction. Baby weighed three pounds and three ounces. Heart never beat.

Five of these Group B cases are of interest as showing the occurrence of death at some time during the expulsive stage, one with a discovered compression of the cord, and one with an evident prematurely separated placenta. These deaths were in a measure avoidable in that, had the expulsive stage been shortened or done away with by

earlier extraction, some of them, at least, would not have occurred. Two of the remaining three showed fetal distress by variation in the rate and rhythm of the heart, and were treated by extraction; yet the child in Case 25821 might well have survived had extraction been undertaken earlier.

Group C comprises nine cases, in all of which delivery was mechanically difficult.

No. 21172.—Primipara. Sent in from O.P.D. where she had been in labor two days, and where she had had bag inserted. Three fingers dilated on arrival, with cervix taken up. Because of mother's poor condition dilatation was completed manually. Cervix shut down on the aftercoming head. Baby stillborn.

No. 21909.—Primipara. Flat pelvis. Cesarean section was considered. Three hours in second stage with fetal heart heard. Breech low-midpelvis. Extraction done, left arm extended, brought out with clavicle fractured. Forceps to aftercoming head. Baby weighed seven pounds. Died five minutes after delivery.

No. 24221.—Primipara. Justo minor pelvis. Both labia large,—size of fists, and vaginal mucous membrane very tough and leathery. Os fully dilated. Vagina torn when dilated, packed, episiotomy done, feet brought down. Left arm behind head. Baby stillborn with fractured left shoulder.

No. 26280.—Para v. Justo major pelvis. Ruptured membranes about 7 P.M., but did not start in labor; bag to be inserted in morning. Cervix on examination thought to be easily dilatable. Dilated manually. Baby's arms extended. Forceps to aftercoming head. Stillborn. Weighed eight pounds and eight ounces.

No. 26378.—Primipara with flat pelvis, promontory by rectum easily felt. Cesarean section decided against because patient had temperature of 101. Fully dilated. Extraction done; head was caught at superior strait, and was pushed through only with difficulty. Baby weighed six pounds, four ounces; stillborn.

No. 28235.—Primipara with diagonal conjugate of 10.5 cm. Fetal heart heard up to four hours before delivery, no later record. Manual dilatation and extraction for lack of progress. Arms delivered without difficulty. Some difficulty in delivery of head. Baby stillborn, weighed seven pounds, two ounces.

No. 30048.—Difficult delivery of eleven pound, four ounce baby after thirty-six hours of labor and long-standing rupture of membranes. Tight uterus, flat pelvis.

No. 30127.—In labor twenty-four hours with ruptured membranes. Cervix three fingers dilated, frank breech, cord prolapsed. Manual dilatation and extraction. Head stuck in cervix, delivered with difficulty. Baby died two hours after birth.

No. 30863.—Difficult extraction after full dilatation.

Group C is of particular interest as showing the danger to the child of a manual dilatation immediately preceding breech extraction. Inasmuch as artificial dilatation of the cervix can never be as effective as the natural, it seems superfluous to urge that the former should be done only in those cases where stringent indication exists for immediate delivery in the interest either of the mother or of the child.

Because of the high fetal mortality rate at the hospital for the year 1920, we were given the special assignment of all breech deliveries for a twelve month period beginning March 1, 1921. Whereas, previous to this period breech cases had been handled routinely by the staff member on service or by the house officers acting under his direction,

it was felt that if a definite method of delivery were followed under strict supervision, the fetal results might be improved. Therefore, during the time of the assignment all primary breech deliveries were conducted by or supervised personally by us. The routine method of procedure was in outline as follows:

1. Careful auscultation of the fetal heart throughout labor.
2. Policy of "hands off" during the first stage, except when, because of lack of progress after rupture of the membranes prematurely, a Voorhees bag was inserted to aid dilatation or to stimulate efficient uterine contractions.
3. Immediate extraction after full dilatation.

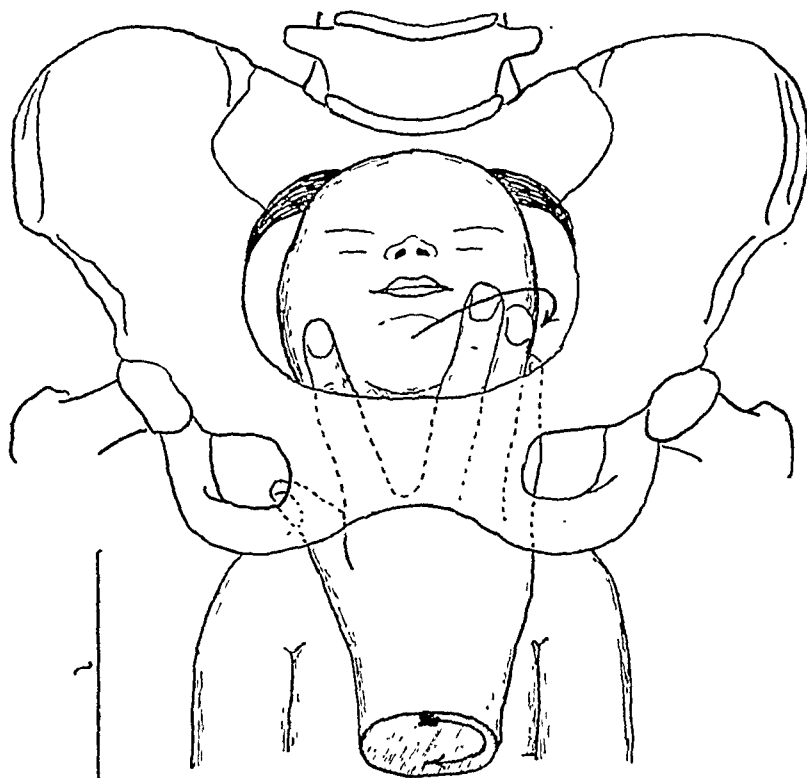


Fig. 3.—The best method of delivering the aftercoming head when the face has rotated anteriorly. The chin is grasped between the index and middle fingers of the operator and rotated posteriorly. The index finger is then inserted in the mouth of the fetus, the head flexed, and delivery effected in the usual manner.

The technic of extraction included the freeing and bringing down both feet by the Pinard maneuver, in the cases of frank breech; the keeping of the baby's back anterior until the scapulae were well down in sight; the delivery of the arms anteriorly under the symphysis, one after the other; and the delivery of the head either by Mauriceau's maneuver combined with suprapubic pressure, or by application of forceps in the occasional case. The bringing down of one arm before beginning the extraction was done in several of the cases, and the hand held down alongside of the baby's hip by means of a fillet around the wrist. This maneuver may be of value in the case of an overlarge baby, but is of no advantage as a routine method. We believe that better results are obtained if the posterior rather than the anterior

arm is thus secured. In one of the cases the head rotated in the pelvis after the body had been delivered, bringing the chin to the pubis; in this case the method of rotation illustrated in Fig. 3 was of great value.

The result of the cases delivered on this assignment was as follows:

TABLE II

	DELIVERIES	DEATHS	MORTALITY PER CENT
Primiparas	13	1	7.7
Multiparas	17	1	5.8
Total	30	2	6.6

One of the deaths occurred in the case of a primipara with a diagonal conjugate of 10.5 cm., in which manual dilatation and extraction were done for lack of progress. The head was delivered with difficulty and the baby was stillborn. The other was in the case of a multipara in which a slow methodical extraction was done "without complication or mishap," following which the baby died on the third day of intracranial hemorrhage.

Although the assignment lapsed on March 1, 1922, the method of procedure was followed in the main throughout that year and has been used in a large proportion of the cases subsequently. The deaths since the assignment ended have been one case of Group A and three of Group C. A comparison of fetal mortality rates during the ten year period as existing before and after the beginning of the assignment shows:

TABLE III

	PRIMIPAROUS			MULTIPAROUS			TOTAL		
	DELIV- ERIES	DEATHS	PER CENT	DELIV- ERIES	DEATHS	PER CENT	DELIV- ERIES	DEATHS	PER CENT
Before	61	8	13.1	93	9	9.7	154	17	11.
After	33	4	12.1	48	2	4.1	81	6	7.4

For purposes of comparison Table III is inserted to show the fetal mortality following delivery by methods other than breech extraction. The cases have been selected in series from the pathologic index of the hospital records, and, wherever feasible, to the number of 235.

The figures given in Table IV indicate that breech presentation deserves its reputation for jeopardizing the baby. They indicate that breech deliveries entail a higher fetal mortality than any form of

TABLE IV

	DELIVERIES	DEATHS	MORTALITY PER CENT
1. Normal deliveries during years 1916 and 1920	920	9	0.97
2. 235 low forceps deliveries beginning 1916	235	3	1.27
3. 235 mid forceps deliveries beginning 1916	235	14	5.95
4. All high forceps deliveries 1916 to 1923 incl.	134	19	14.18
5. 235 abdominal cesarean sections beginning 1916	235	2	0.85

delivery by the presenting occiput save the operation of high forceps. Therefore, the method of conversion of the breech presentation into a vertex by external version deserves at least a trial if the case is recognized either before labor starts or early after it has begun. We believe, with Crothers and the Sloan group, that rough handling of the baby during breech extraction may and often does cause death from direct or indirect trauma. We believe, however, that if the case in which a breech presents is deemed suitable for delivery via the pelvic route the baby should be extracted as soon as full dilatation of the os has occurred, rather than be submitted to the dangers resulting during the second stage from compression of the cord and from premature separation of the placenta.

443 BEACON STREET

POSTOPERATIVE PAROTITIS WITH A REPORT OF CASES*

BY THOMAS C. PEIGHTAL, M.D., NEW YORK, N. Y.

ACUTE pyogenic parotitis, though occurring rarely as a distinct entity in healthy individuals, somewhat more frequently in a recurrent form, due to duct obstruction from stone, mucus, injury and other causes, and still more frequently in cases of acute, general infection, or in states of debility due to wasting diseases, is not altogether uncommon as a postoperative complication. As practically every surgeon has, at some time in his experience, encountered this last type of parotid infection, a brief report of several cases, with remarks concerning the possible etiology, may be of interest here.

During the past four years, nine such cases have occurred in the operative services at the Roosevelt Hospital,—six of these recently, within a period of five months, previous to which time there had been a free interval of almost three years. Five of the cases are from the gynecologic service, and two cases each from the two surgical services. They naturally fall into three groups: mild, moderately severe, and severe, and may be briefly described as follows:

CASE 1. Mrs. I. M. G. (C13319), widow, aged fifty-nine was operated upon December 31, 1924, under general anesthesia, receiving 2400 mg. hours of radium, for carcinoma of the cervix. On January 16, 1925 she received 1000 mg. hours in the vaginal vault, without anesthesia, and on January 22, a third application of 1500 mg. hours, in the upper cervix again under general anesthesia. On the sixth day after the last procedure the temperature rose from normal to 103° F. and there was moderate bilateral swelling of both parotids, which subsided spontaneously under cold applications in about five days.

*Read by invitation before the New York Obstetrical Society, May 12, 1925.

CASE 2. Mrs. D. K. (C13350), aged thirty-two, was operated upon February 20, 1925, an extensive myomectomy for fibroids. Several hours afterwards the patient required an infusion of 1000 c.c. of saline solution, after which she had a chill and temperature rise to 106°, dropping within three hours to 101°. The following day a moderate, bilateral parotitis developed, which subsided rapidly in three days. Further recovery was uneventful.

These two cases are characteristic of a mild type of parotitis, which is probably due to some type of temporary duct obstruction, either mucus or swelling of the papilla, rather than from a diffuse inflammation of the gland elements. It would seem that such cases are of more frequent occurrence than is generally supposed, for they may be readily overlooked, particularly if the local swelling is only of moderate size. They usually subside rapidly within a few days.

CASE 3. Mrs. M. B. (C13240), aged twenty-six, was operated upon in October, 1924 for bilateral tuboovarian abscess, a complete abdominal hysterectomy and appendicectomy being done. On the third day after the operation the patient developed a right parotitis, with temperature of 104°. This was treated with ice, and mouth wash, and by the seventh day the temperature was down to 99°. The local condition subsided very slowly without suppuration, and three weeks later a small bleb, containing a drachm of seropurulent fluid appeared just below the right ear. This was incised, and apparently did not communicate with the gland, which receded gradually to normal, four weeks after onset.

CASE 4. Mrs. C. B., aged thirty-three, was operated upon April 11, 1925, cholecystectomy, with drainage. On the tenth day she developed a right pleurisy and the temperature rose to 103°. The patient was quite ill, and on the twelfth day, after x-ray, 50 c.c. of serosanguineous fluid was aspirated from the right chest. On the fourteenth day it was thought that a subdiaphragmatic abscess might be present so, after transfusion and exploration with needles under a general anesthetic without obtaining pus, the abdominal wound was explored. No exudate was found, and a small collection of old blood-clots was removed. On the night of the third day after this last procedure, the patient developed a left parotitis, which involved the whole gland. Under treatment with ice, fluctuation did not develop, and to date, sixteen days after its onset, the gland appears almost normal.

CASE 5. Miss M. D. (C10929), aged fifty-nine, menopause ten years previously, was operated upon in November, 1921, for adenocarcinoma of the fundus, a complete abdominal hysterectomy being done. The appendix was not removed. On the fourth day after operation with a temperature of 104°, she developed a bilateral parotitis, which was treated with ice. No fluctuation developed and the induration subsided very slowly. Eighteen days after the onset, a small, superficial skin bleb containing about one-half a drachm of pus, was incised just in front of the left ear. It did not communicate with the parotid tissue. Two weeks after this a similar bleb was incised in front of the right ear. Five weeks after onset both glands had returned to normal, and the patient was discharged.

CASE 6. Miss J. I. W. (B13814), aged fifty-two, was operated upon January 27, 1921, for duodenal ulcer and gallstones. She had a cholecystectomy, posterior gastroenterostomy, and appendectomy. There was a moderate postoperative reaction and the patient was doing well until the fifth day, when the temperature rose to 101°, and swelling was noted in the right parotid gland. Three days later there was a definite lobar pneumonia of the right lower lobe, and four days after that

the patient rapidly failed and died. There was no fluctuation in the parotid, and pneumonia was considered the cause of death.

CASE 7. Miss L. V. (C10850), aged thirty, was operated upon in October, 1921, a rather extensive myomectomy being done. The appendix was routinely removed. The course was uneventful, and the patient was out of bed on the fourteenth day. On the sixteenth day the temperature suddenly rose to 103° and a unilateral parotitis was noted. The wound showed no evidence of induration, and the pelvis was normal. By the twenty-first day the parotitis was subsiding under local treatment with ice and mouth wash, when the temperature again went up to 102°. Several days later a small abdominal wall abscess was opened at the lower angle of the wound, and the temperature rapidly subsided to normal on the thirtieth day.

The interesting feature here was the unusually late appearance of the parotid infection, and the subsequent development of a wound abscess. The latter, often obscure for a time, might have antedated the parotid involvement and, to those who accept the metastatic etiology of parotitis, this may seem an excellent example. However, a careful study of the observations, made at that time, indicates that the parotitis definitely preceded the wound infection.

These five cases just described (3 to 7) may be termed moderately severe in that they do not subside within a few days and that the infection usually becomes general throughout the whole gland but does not proceed to active suppuration or abscess formation. After the first few days the pain disappears, and the massive induration, which subsides very slowly, is the chief characteristic. The blebs mentioned above are, no doubt, most frequently due to continued ice application. Some advocate opening this type of gland, but without fluctuation this would seem unnecessary. However, should such a process appear elsewhere on the body than the face, incision and drainage would, no doubt, be more frequently practiced.

CASE 8. Mrs. A. K. (B.20646), aged forty, was operated upon January 3, 1925, for fibroid uterus, a complete hysterectomy and routine appendicectomy being done. The procedure was somewhat prolonged and difficult due to a large fibroid situated low in the cervix. The immediate postoperative reaction was marked, temperature 103 to 104°, pulse 120 to 130, and the patient required hypodermoclysis on two successive days, during which time the fluid intake by mouth was practically nothing. On the sixth day an abdominal wound abscess was opened and contained *B. coli*. Twenty-four hours later, on the seventh day, a bilateral parotitis began and was treated with ice and mouth wash. For a time the gland inflammation seemed stationary, and it was thought it would recede; but, on the seventeenth day—ten days after onset—fluctuation was noted, and both sides were opened by horizontal incision under novocaine, at the most dependent point for drainage. Culture showed *Staphylococcus aureus*. A week later a partial paralysis of the right seventh nerve developed. Four weeks after incision, both parotid wounds were healed and the patient left the hospital, but the facial paralysis was unimproved. Two months after incision she was seen at recall. The scar formation was slight and the paralysis had entirely disappeared.

CASE 9. Mr. J. H., aged thirty-five, was operated upon for duodenal ulcer on April 15, 1925, an excision of the ulcer with Horsley type of pyloroplasty and appendicectomy being done. He was put on a gastroenterostomy diet with rectal

glucose only for twenty-four hours, then water in drachm doses every two hours, gradually increasing. On the fifth day the temperature which had been 100° went up to 103°, and a right parotitis developed which was treated with ice and mouth wash. The gland was moderately swollen and an abscess ruptured into the external auditory canal four days later, even before fluctuation could be made out externally. A horizontal incision, one and a half inches long, was made just below the angle of the jaw, on the tenth day, and the abscess opened bluntly with a clamp. Culture showed *Staphylococcus aureus*. The temperature became normal six days later, the gland subsiding rapidly. The abdominal wound remained clean.

These two cases illustrate the more severe type of this complication where suppuration takes place and incision is necessary. Fortunately we have no example in this group, of the acute gangrenous type which causes sloughing of almost the entire gland and very often, in spite of incision, ends fatally.

Prognosis.—The mortality in those cases requiring incision is uniformly considered in the literature to be about 30 to 33 per cent but in many instances these figures are rendered inaccurate by the fact that the original condition for which operation was performed is often a definite factor in the mortality.

Diagnosis.—The diagnosis of postoperative parotitis is usually an easy matter. Sudden rise of temperature, pain in the neck and ear, followed by red, tender swelling of the gland is seldom missed, especially after abdominal or other operation, remote from the involved region. However, if the operative field be near by, one must differentiate this condition from lymphadenitis and cellulitis; for the gland itself can be masked by edema, and early rupture of the capsule with extension downward along the cervical tissues may make the problem of diagnosis more difficult. Then, of course, the possibility of epidemic parotitis must always be kept in mind.

Inspection of the papilla of the duct opening opposite the second molar tooth will usually show swelling and redness, while frequently a drop of pus may be expressed from the mouth of the duct by gentle pressure on the gland. Spurling and Stewart, in reporting four cases of primary pyogenic parotitis in otherwise healthy individuals, call attention to the fact that the duct opening may appear normal. They advise catheterizing it with a small glass pipette, and if examination reveals many leucocytes on smear and a practically pure culture of one of the usual organisms, the diagnosis is proved.

Bacteriology.—*Staphylococcus aureus* is generally conceded to be the most frequent causative agent. In each of the two incised cases reported, this organism was obtained in pure culture. The consensus of opinion varies as to the frequency with which other organisms are found, but most writers usually mention the pneumococcus, the streptococcus, and the colon bacillus, in the order named.

Occurrence.—This type of parotitis occurs most frequently in adults, and most writers observe a greater incidence in females than in males. Blair, in a recent monograph, says that pyogenic parotitis is observed more commonly in the third decade, in females, and that the great majority of his cases occurred between the months of November and April, when respiratory infections are more prevalent. He found bilateral involvement in 20 per cent of the cases, while Dyball, at an earlier date, placed this figure at 33 per cent. In those cases reported, 44 per cent were bilateral, all occurred between October and March, and eight of the nine were in women.

Course.—The course of this complication varies greatly from the very mild cases, with little fever and swelling subsiding in a few days, to the severe suppurative type requiring incision, and from five to six weeks for regression. In the series just given, the shortest time was three days and the longest four weeks. Pneumonia, in varying degrees is the most frequently observed complication in this course. The case referred to which ended fatally may be an illustration.

Suppuration without incision usually results in spontaneous opening through necrosis of the overlying fascia and skin, or frequently into the external auditory canal, the temporal fossa, or the pharynx, with occasionally a resultant gangrene of the entire gland.

Treatment.—It must be emphasized that all observers are in accord upon the treatment of this condition. Cold applications, usually ice, with frequent mouth wash and mastication exercises to promote salivary flow, are used in the early stages and may suffice for the milder cases. However, some writers prefer heat to cold and report excellent regression from its use.

If close observation reveals that the general symptoms are becoming worse and the local inflammation is rapidly extending, incision is indicated, even before frank fluctuation is noted, because the parotid is surrounded by a particularly tough capsule and, therefore, gangrene develops with extreme rapidity.

Blair says that one should open the gland, in doubtful cases, not later than the second twenty-four hours, and that delay is far more serious than to incise needlessly. He points out that the same rules govern here, as in acute appendicitis. Similar opinion is held by Lilienthal, Fisher, Lynn, LeDentu, Fantozzi, and practically every surgeon who has reported cases. It will be noted in one of the cases reported above, that spontaneous rupture into the external auditory canal occurred, within four days after onset.

There are slight differences as to the type of incision. Blair, Lilienthal and Fisher have each described incisions which are vertical, quite extensive and differ but little in location. Approximately, they begin just below the zygoma, and pass downward close to the ear, to reach

a point just behind and below the angle of the jaw, from which point further extension is carried slightly forward, not further than the anterior border of the masseter muscle. Fisher adds a small Y-shaped extension from just below the ear, upward and backward over the mastoid to open this portion of the gland. Wagner and Jennings have used a horizontal incision, placing it with reference to the facial nerve and external carotid artery.

All these dissections are carried down through skin and superficial fascia only, these parts being then stripped forward, exposing the gland which is punctured bluntly in as many places as may be necessary, avoiding the duct and facial nerve. All these writers prefer this extensive opening, not only for its safety and efficiency, but they state that the cosmetic result is better than where the stab-wound type of opening is used. Direct incision into the gland may result in salivary fistula.

Etiology and History.—Views as to the etiology of postoperative parotitis, have changed markedly as the advancement of surgery has nullified the former hypotheses.

Wagner says that Munde in 1878, described the first case of parotitis after ovariectomy, and soon thereafter Moericke, Goodell and others reported further cases after similar operations. Paget, in 1886, collected 101 cases of this complication and, as abdominal surgery then chiefly dealt with the pelvic organs, particularly with ovariectomy, advanced the hypothesis that the peritoneum, genital organs and parotids were indirectly and reflexly related. Taylor, in the same year, suggested sepsis as the cause and there was repeated controversy over this point until Hanau in 1889, declared that parotitis occurred secondary to infection of Stenson's duct by mouth organisms.

The theory of reflex relation to the pelvic organs was soon discarded as the surgical field broadened, and it was found that parotitis occurred just as frequently after operation elsewhere on the body. However, the two theories that metastatic foci develop in the parotid only from sepsis, on the one hand, and that it is a local extension of infection from the mouth up Stenson's duct, on the other, have continued until today, with, at present, the more general consensus of opinion favoring the latter view.

Rolleston and Oliver in 1919, discussed the occurrence of secondary parotitis in the medical treatment of 1000 cases of gastric ulcer. In 530 cases, where some food was allowed by mouth, the incidence of this complication was 0.4 per cent, while in 470 cases treated by oral starvation with rectal feeding only, 4 per cent or ten times as many patients developed parotid infection when the salivary glands were inactive. Collins, in the same year, reached similar conclusions in

reporting a series of parotitis cases occurring in patients on the Ochsner treatment.

Hanau and Pilliet in their monographs, said that organisms go up the duct and, in their pathologic specimens, demonstrated that the inflammation began around the ducts and spread outward into the perilobular tissues; whereas, they argued, should the etiology be embolic, the inflammation should at first appear as a perivascular process.

Tait and Girode have both shown that the outer third of Stenson's duct normally contains the same organisms as are found in the mouth. On the other hand, Dyball states that if buccal dryness is a factor in promoting parotitis, the sublingual and submaxillary glands should be affected with similar regularity. These glands are occasionally involved, but rarely so, cases having been reported by Jennings and others. The rarity of this condition is explained by Lynn, who observes that the parotid is essentially a serous gland while the sublingual and submaxillary glands are of the mucous variety; he adds that Stuart-Low has demonstrated a definite inhibitory influence of mucin on bacterial growth. Likewise the parotid contains lymph nodes, while the other glands do not, thus favoring the extension of inflammatory processes in the former.

Manton and others have reported parotid involvement in pernicious vomiting of pregnancy but state that its occurrence is extremely rare.

Certain contributing factors which influence early extension of infection up the duct have been mentioned. Among these are the inhibition of salivary flow by pyrexia, and by such drugs as atropine, as well as the possibility of anesthetic injury by too vigorous compression at the angles of the jaw. Likewise general debility and chronic wasting diseases seem to be factors which increase the incidence of parotitis following operation.

In spite of the above observations, many surgeons are of the opinion that secondary pyogenic parotitis originates as a result of metastatic foci from purulent exudates elsewhere in the body, or is a part of a general pyemia. Buscarlet and Kaiser abroad, and Jennings and Fisher, in this country, hold this view. Certain cases reported would seem to corroborate this theory but as a rule the evidence of positive blood culture is lacking. Blair, from his own cases and a careful study of the literature, concludes that in a great majority of instances postoperative parotitis is not blood borne.

Prevention.—Even though the etiology of this condition has not definitely been proved, still, with the weight of evidence so strongly favoring the mouth as the source of infection, any preventive measures must necessarily be directed at this point.

The systematic examination of the teeth and buccal mucous membranes, with as much care as one would consider the heart, lungs or

blood pressure before operation, and the adoption of means to minimize oral sepsis, particularly in those debilitated individuals with chronic wasting diseases, would serve to eliminate many cases of this complication.

It is quite true that in emergency operations there is no time for such measures, but even here the immediate postoperative care of the mouth must be emphasized if parotitis is to be avoided. The contributing factor of buccal dryness, with the increased number of mouth bacteria can be prevented with early administration of fluids, mouth wash and mastication exercises, for which chewing gum and hard candy have been highly recommended. The last is of particular value in those cases where the type of operative procedure necessarily prohibits fluids by mouth in the first forty-eight hours. Likewise, these measures, with gentle massage of the gland, will, at times, serve to abort an early parotitis by reestablishing drainage through the duct.

In conclusion, it is earnestly suggested that the value of such preventive measures be noted and where cases do occur, that a bacteriologic study of the blood, gland and mouth be made. Such data will greatly aid in establishing the true etiology of this condition.

REFERENCES

- Blair, V. P.: *Med. & Surg.*, March, 1917, i, 34.
 Blair, V. P., and Padgett, E. C.: *Arch. Surg.*, 1923, vii, 1-36.
 Buscarlet: *Bull. et mém. Soc. de Chir. de Paris*, 1907, xxxiii, 1263.
 Bunts, F. E.: *Am. Jour. Med. Sc.*, May, 1904, cxxvii, 803.
 Collins, C. U.: *Surg. Gynec. and Obstet.*, April, 1919, xxviii, 404.
 Deaver, J. B.: *Ann. Surg.*, 1919, lxix, 128.
 Dyball: *Brit. Med. Jour.*, 1904, i, and *Ann. Surg.*, Dec. 1904.
 Fantozzi, G.: *Policlinico*, Rome, Sept., 1924, xxxi, 462.
 Fisher, Wm. H.: *Ann. Surg.*, 1923, lxxviii, 568.
 Fenwick: *Brit. Med. Jour.*, May, 1919.
 Girode: *Brophy's Oral Surgery*, 1915, p. 966.
 Goodell: *Med. Times and Gaz.*, 1881, ii, 290.
 Hanau: *Beitr. z. path. Anat. u. z. allg. Path.*, 1889, ii, 5.
 Jennings, F. D.: *Long Island Med. Jour.*, xvii, 4, 134.
 Kaiser: *München. med. Wehnschr.*, Oct., 1921.
 LeDentu: *Arch. gén. de méd.*, 1903, i, 721-723.
 Lilienthal, H.: *Am. Jour. Surg.*, 1917, xxxi, 4, 101.
 Lynn, F. S.: *Surg. Gynec. and Obstet.*, 1922, xxxiv, 367.
 Manton, W. P.: *Jour. Am. Med. Assn.*, 1918, lxxi, 104.
 Paget, S.: *Lancet*, 1886, i, 86 and 732.
 Pilliet: *Bull. Soc. anat. de Paris*, 1890, p. 182.
 Rolleston and Oliver: *Brit. Med. Jour.*, May 29, 1919.
 Spurling, R. G. and Stewart, F. W.: *Boston Med. and Surg. Jour.*, exc, 826-831.
 Taylor, F. T.: *Lancet*, 1886, i, 130.
 Tait: *Brophy's Oral Surgery*, 1915, p. 966.
 Wagner, G.: *Wien. klin. Wehnschr.*, 1904, xvii, 1407.

OBSTETRIC MORTALITY*

AN ANALYSIS OF THE CASES AT THE LYING-IN HOSPITAL IN 1924

BY MEYER ROSENTOHN, M.D., NEW YORK, N. Y.

(*Attending Surgeon, Lying-In Hospital*)

IT is with considerable trepidation that this paper is presented, for the figures are high and the report not very encouraging, but at the same time, presenting facts which warrant discussion. It is based on the service of the New York Lying-In Hospital for the year 1924.

As a preliminary, it is necessary to emphasize certain fundamental facts, well known as they undoubtedly are, for a proper interpretation of the figures and remarks:

1. The City Health Department requires a stillbirth certificate for every case where an embryo or fetus is expelled, whether the period of gestation be three months or ten months.

2. A stillbirth differs from a death of baby in the absence of respiratory movement; thus, a fetus, born with the heart beating even for an hour or more, if no respiratory effort be made, is considered a stillbirth.

3. A premature baby has been arbitrarily considered where the time factor was not available, as a fetus weighing 1600 grams or less. The term premature and its application is being considered by a committee from several of the maternity hospitals and the criteria for the classification are not yet determined.

4. Finally, in analyzing the figures it must be remembered that a hospital with public wards has a greater proportion of abnormalities and operations, hence, a greater incidence of morbidity and mortality.

During the year, there were in an indoor and outdoor service, a total of 5,457 confinements, among which there were 227 stillbirths and 152 infant deaths. During this period there were 23 adult deaths.

Considering the maternal deaths first, and eliminating one, a surgical case in a patient who was not pregnant, there were 22 obstetric deaths, a mortality of 0.4 per cent, or 4 per thousand. Among these cases there were:

1. Two patients with syphilis dying antepartum, after the administration of salvarsan. The symptoms indicated an encephalitis.

2. One case of antepartum sepsis where the patient had been ill for two weeks, had a high temperature on admission, and died within a half hour of the spontaneous delivery of a stillborn fetus.

3. One patient with postpartum sepsis, admitted three days after delivery by an outside physician, and dying five days later.

4. Two cases of endocarditis with decompensation, one patient in the fifth month, and the other in the seventh month of pregnancy. In both of these a vaginal hysterotomy was done for the cardiac conditions; both died within a few hours after the operation.

*Read, by invitation, at a meeting of the New York Obstetrical Society, May 12, 1925.

While these six deaths occurred in the hospital, in the effort to arrive at a figure directly applicable to our institutional care it might be feasible for the time to subtract them from the 22 maternal deaths, thus leaving 16 in 5,457, a percentage of 0.3 or 1 in every 341 cases. In this connection the figures of the New York Health Department for the entire city, for 1923, indicate a death rate of 623 in 135,183 births,—a percentage of 0.46, or 46 per thousand, or 1 in 217 cases; and for 1924, a death rate of 678 in 136,884 births,—a percentage of 0.5, or 50 per thousand, or 1 in 202 cases.

It may be well for a moment to refer to the deaths due to salvarsan. The two patients were in the last month of gestation and had been treated for syphilis for some time because of a positive Wassermann. Both were given neosalvarsan intravenously with the usual precautions, only 0.45 grams being administered. Both developed toxic symptoms, became drowsy, and died within a week. No autopsies were permitted. Whether these cases occurring within a short time warrant the assumption of increased danger of salvarsan administration in the antepartum period, or were due to some coincidence either in the patients or the drug is a matter for discussion. Such an experience, however, in the hands of an expert with all the safeguards has made the staff at the Lying-In Hospital timorous about forcing this treatment at such a period.

In the sixteen cases of our remaining adult deaths, there were nine cesarean sections, three internal podalic versions, and four spontaneous deliveries.

Cesarean section was done 190 times during the year, an incidence of 3.48 per cent, or 1 in 28.7 cases, with a mortality of 4.7 per cent. Death was due to the following causes: general peritonitis in three, embolism in two, postpartum hemorrhage in one, postpartum sepsis in one, lobar pneumonia in one, and shock and relaxation of the uterus in one.

Internal podalic version was done 149 times during the year, an incidence of 2.73 per cent, or 1 in 36 cases with a mortality of 3 per cent. Death was due to postpartum hemorrhages from placenta previa in one, from premature separation of the placenta in another, and from ruptured uterus and general peritonitis in a third case.

It is, of course, to be remembered that while this represents a fatality where the operation of internal podalic version was done, death was due to the placenta previa and premature separation of the placenta, so that our real death rate is only one, the last, where the operation was done for a generally contracted pelvis.

In the remaining cases, in which the deliveries were spontaneous, there were three cases of eclampsia and one of embolism.

There were 13 cases of eclampsia during the year, an incidence of 1 in 419, and a mortality of 23 per cent.

Now, considering the fetal and infant death rates, there were in the total confinements of 5,457, with 5,508 babies:

Stillbirths	227 or 4.1 per cent or 41 per 1000
Infant deaths	152 or 2.8 per cent or 28 per 1000

In all of these 379 deaths and stillbirths there were 159 autopsies.

With the definitions already outlined, these stillbirths are classified under the headings of full term, premature, and macerated, in Table I.

TABLE I

	NO. OF CASES	PER CENT OF TOTAL CONFINEMENTS (5,457)
Macerated	94	1.7
Premature	48	0.9
Full term, operative	59	1.0
Full term, spontaneous	26	0.5

Thus, it is seen that in 94 cases or 41 per cent of the stillbirths the fetus was already macerated at the time of delivery. Among these, there were:

Positive Wassermann in mother	15
Negative Wassermann in mother	60
No Wassermann taken	19

In more than half of the macerated fetuses (64 per cent), there was neither clinical nor laboratory evidence of lues in the mother, nor was there any evidence in the stillborn fetus at the postmortem examination. Excluding the 15 positive cases, in the 79 remaining macerated fetuses definite causes were found in 35 cases as follows: toxemia and eclampsia, 13; previous stillbirths, 5; diabetes, 4; fall or blow, 2; tight cord, 3; placenta previa, 2; hydrocephalus monster, 2; pyelitis, 1; premature separation of placenta, 1; fibroid uterus, 1; and general peritonitis in mother, 1.

In the remaining 44 cases, including the 19 in which no Wassermann was made, the causes were not ascertainable.

As stated above, the premature infants among the stillbirths numbered 48 and included all embryos or fetuses under 1,600 grams. Many of these were cases properly called abortions of three to five months, but 5 were anencephalics, and will be referred to later.

In considering the deaths of babies, all cases were included where the child breathed and where death occurred either immediately or at any time in the hospital stay of ten days. For purposes of classification these were subdivided into premature or full term, as here shown:

Premature	73 or 1.3 per cent of total confinements
Operative delivery	19
Spontaneous delivery	54
Full term	79 or 1.4 per cent of total confinements
Operative delivery	28
Spontaneous delivery	51

A consideration of the full-term baby and the method of delivery is of interest:

	Stillbirth	Deaths
Operative delivery	59	28
Spontaneous delivery	26	51

In other words, a total of 164 full-term deaths and stillbirths occurred in 5,457 confinements.

An interesting study of the important causes in these full-term cases is given in Table II.

TABLE II

	OPERATIVE	SPONTANEOUS
Atelectasis and asphyxia	28	18
Cerebral hemorrhage	28	15
Fracture or separation of vertebrae	8	3
Craniotomy	6	
Anomalies	4	11
Inanition		5
Bronchopneumonia		3
Hemorrhagic disease		4
Other causes	13	18
Total	87	77

The incidence of cerebral hemorrhage in almost one-third of the operative and one-fifth of the spontaneous deliveries is noteworthy. Next to this is the occurrence of anomalies, including congenital malformations, almost all incompatible with life; four of which were in the operative and eleven in the spontaneous deliveries.

Table III deals with the congenital anomalies most of which came to autopsy.

TABLE III

	DEATH		STILLBIRTH			TOTAL
	FULL TERM	PRE-MATURE	MACERATED	FULL TERM	PRE-MATURE	
Anencephaly			1	3	5	9
Monstrosity	1					1
Congenital heart	2					2
Umbilical hernia	3					3
Hydrocephalus			1			1
Hydrocephalus and spina bifida	1	1			1	3
Eventration	1					1
Stricture of esophagus	1					1
Absence of intestine	2					2
Diaphragmatic hernia	1					1
	12	1	2	3	6	24

The study of the mortality records for the year has afforded the opportunity to obtain the rates for the more common obstetric procedures and conditions and so has developed some significant figures. These are noted in Table IV, which excludes the macerated fetuses from consideration.

With regard to the six craniotomies, in three cases perforations were performed where internal podalic version had been done. One

was a full-term and two were macerated fetuses. The other three were craniotomies on full-term fetuses; one of these was already dead at the time of delivery, congenital lues being present.

TABLE IV

	ADULT DEATH	TOTAL NO. CASES	% MATER. DEATH	BABY					INCI- DENCE 1 IN	% FETAL MOR- TALITY
				FULL TERM		PREMATURE		TOTAL		
				DEATH	STILL- BIRTH	DEATH	STILL- BIRTH			
Placenta previa	1	23	4.3	1	4	6	2	13	237	56
Premature separation of placenta	1	11	9.0	1		1	1	3	495	27
Prolapsed cord		29		1	3			4	188	14
Cesarean section	9	190	4.7	1	5	4	3	13	29	6.8
High forceps		27			5			5	202	22
Craniotomy		6			6			6	909	

The striking figures in Table IV are the 4.7 per cent maternal and 6.8 per cent stillbirth and infant deaths in the cesarean cases, the high baby rate for high forceps, and the comparatively low rate for prolapsed cord. Hofmeier¹ reports regarding placenta previa, an incidence of 1 in each of 79 obstetric cases, with a death rate of 7.5 per cent. Kellogg,² reporting on the mortality of placenta previa for the last twenty-five years at the Boston Lying-In Hospital, refers to a total of 218 cases with 38 maternal deaths or 13.5 per cent. To be fair, however, the figures range from 17 per cent (1895-1900), and 24 per cent (1905-1910), and 6 per cent (1915-1920), with a fetal mortality in 1910-1915 of 44 per cent and for 1915-1920 of 48 per cent. Lynch,³ reporting on placenta previa at the Boston City Hospital, states an incidence of about 1 in 100 cases, with a maternal mortality of 19 in 91 cases, or 20 per cent, and a fetal and baby mortality of 51, or 55 per cent; excluding macerated fetuses and nonviables, he has a corrected fetal mortality of 25 per cent.

The breech deliveries are indicated in Table V.

TABLE V

	DEATHS	STILLBIRTHS	TOTAL
Premature	4	5	9
Full term	9	8	17
Macerated		10	10
	13	23	36

The total number of breech cases was 140, which results in an incidence of 1 in 39 cases and a mortality of 26 per cent. Although this is the gross mortality in the breech cases, if the ten macerated fetuses are excluded it becomes 18 per cent.

An analysis of the causes of death in the 17 full-term breech cases referred to above gives the following: Anencephaly, 2; hydrocephalus and spina bifida, 1; separation or fracture vertebrae, 3; as-

phyxia, 5; cerebral hemorrhage, 5; and hemorrhagic disease, 1. If the three congenital anomalies are eliminated from the 26 breeches there is a mortality of 23, or 16.4 per cent for the breech cases.

The figures quoted and the tables outlined indicate a maternal mortality per 1000 of 4, a stillbirth rate of 41 and a baby death rate of 28. How these compare with figures published elsewhere is shown in the statistics quoted by Dr. Dublin,⁴ of the Metropolitan Life Insurance Co., who says, in an address before the American Child Hygiene Association,⁴ "There are born alive each year in the United States approximately 2,620,000 babies. Of this number about 7.6 per cent, or 199,200, die before they are a year old. Early infant mortality accounts for about 109,000 of these deaths. These deaths are, for the most part, due to the following conditions: malformations, prematurity, congenital debility, syphilis, and injuries at birth. To this number must be added an almost equal number of fetal deaths at or near full term, which properly belong to this group. These are the stillbirths, which number about 100,000."

In a discussion of Dr. W. J. Bell's paper on maternal mortality read before the same association, Dublin further refers to a maternal death rate of close to 8 per 1,000 in the United States, and in New York City, a little under 5 per 1,000. In other words, in 2,620,000 births there were about 109,000 early infant deaths (under one month) and 100,000 stillbirths; a percentage for the latter of 3.8, and for the former 4.1, a total of 7.9.

Bell, at the same meeting, reported a maternal mortality, in Ontario, of 4.52 per 1,000, in 1919, and 6.75 per 1,000, in 1925. The rates for England and Wales were 4.12 per 1,000, in 1919.

In the city of New York, the last figures obtainable, for 1923 and 1924, are as follows:

	1923	1924
Total birth rate	135,183	136,884
Stillbirths	6,023—4.4 %	6,448—4.7%
Total deaths under 1 month	4,132—3.1 %	4,346—3.2%
Maternal deaths	625—0.46%	678—0.5%

Kickham,⁵ in a series of 1,000 consecutive obstetric cases at St. Elizabeth's Hospital, reports a maternal mortality of 5 or 0.5 per cent, and 55 infant deaths or stillbirths. Haven Emerson,⁶ in a study of "Maternal and Infant Mortality in Physicians' Families," reports that in 1,974 pregnancies, there were 1,910 living children and 9 maternal deaths.

As showing the influence of prenatal care, a report on "Prenatal Work in Detroit"⁷ indicates a mortality of 3.1 per 1,000 in 1,599 cases under the care of the prenatal clinic; for the entire city, in 1922, in 27,277 confinements, there was a maternal mortality of 6.8 per cent per 1,000, and a stillbirth rate of 53.

A bulletin from the Department of Commerce, at Washington,

shows for the Birth Registration Area of 1915 (constituted by 10 states and the District of Columbia) a maternal mortality of 6.4 per 1,000, in 1923. Of 30 states with available figures the rate varies from 5 (in Utah) to 9.7 (in South Carolina).

The one hundred and second annual report of the New York Nursery and Child's Hospital for 1924 gives some parallel statistics which are of interest. In their service, including 1,833 indoor deliveries with 1,852 births, and 444 outdoor deliveries with 447 births, there were:

Maternal death rate of	9, or 0.4 per cent, i.e., 1 in 252.
Stillbirth rate of	107, or 4.4 per cent, i.e., 1 in 22.4
Baby death rate of	30, or 1.3 per cent, i.e., 1 in 76.

A total of 24 macerated fetuses occurred, representing about one-fourth of the stillbirths. Breech presentation was encountered 88 times; placenta previa, with 1 maternal death and 4 stillbirths, 11 times; high forceps, 25 times; and craniotomy, 4 times. Among the stillbirths anencephaly occurred 5 times and other defects of development 6 times. Among the deaths of babies congenital anomalies occurred 4 times and premature separation of the placenta, with 7 stillbirths, occurred 12 times.

A study of the figures quoted from the New York Lying-In Hospital and a comparison with those from other places, leaves one with a discouraging sense of the inevitability of certain figures. High as is the stillbirth and baby death rate, and the loss of mothers, one must be struck by the fact that a certain cost must be paid. It is true that, considering the infants, there should not have been 3 craniotomies on living babies, or 10 fractures or separated vertebrae, or 43 cerebral hemorrhages, yet there can never be eliminated the 24 congenital anomalies, the premature babies, miscarriages or abortions, or in great measure, the occurrence of macerated fetuses.

What should be done, however, is to concentrate more on the full-term fetuses, by watching for abnormalities; not to permit a woman who has gone through more or less distress for ten months to have a stillborn baby because interference was not instituted until too late. The fetus should be observed closely for signs of distress as evidenced by a passage of meconium, turbulent movements, or by rising, slowing, or irregularities of the heart. The obstetrician should interfere, and not alone where there is fetal distress but even before this state is reached.

REFERENCES

- ¹Jour. Am. Med. Assn., April 28, 1923, lxxx, 1278.
- ²Boston Med. and Surg. Jour., Oct. 13, 1921, p. 435.
- ³Boston Med. and Surg. Jour., April 10, 1924, exc, 631-634.
- ⁴Mortality of Early Infancy. Address delivered before American Child Hygiene Association, 1922.
- ⁵Boston Med. and Surg. Jour., Dec. 11, 1924, exci, 1110-1111.
- ⁶Am. Jour. Hygiene, July, 1924, iv, 365-385.
- ⁷Jour. Am. Med. Assn., Dec. 22, 1923, lxxxi, 2121.

CONGENITAL HERNIA AT THE LINEA ALBA

BY H. R. CHARLTON, M.D., BRONXVILLE, N. Y.

(*Attending Obstetrician, Lawrence Hospital, Bronxville, N. Y.; Adjunct Assistant Surgeon, Woman's Hospital, New York City*)

CONGENITAL hernia at the linea alba occurs approximately once in each five thousand births and at various periods its accumulated literature has been reviewed. A study by Linfors, of Lund, covered the subject from the time of Paré to 1891; the Zurich dissertation of Guido Alder, of Samaden, carried it to 1903; the Rittershous "Arbeit" was published at Leipzig, in 1907, while somewhat later the Bordeaux thesis of Pain terminated its monographic consideration, the combined effort of these investigators resulting in a résumé of sixty cases. Recently my study of all reports available in the files of the New York Academy of Medicine and the Surgeon-General's Office indicates that up until 1925, two hundred and fifty cases have been described in the international literature, and it has been possible, through personal communication, to accumulate several others. Lack of space and the doubtful value of so many individual case reports make it desirable to withhold these voluminous details.

Oken and Meckel, in 1810 and 1812, first recognized this defect to be due to the persistence of a condition normal during early intra-uterine life, easily appreciated in a six mm. embryo where inspection shows no effort at umbilical cord formation; but a ventral mound enclosing a cavity outside of, yet continuous with the abdomen, containing primitive ileum and jejunum in U-loop formation. If at the tenth week some defect in the embryonal developmental scheme occurs and the U-loop or other partially or completely contained viscera are not withdrawn, there occurs the cardinal step in the production of this condition; the extraabdominal anatomy soon reaching a size precluding its future abdominal placement, further growth taking place outside of the usual body cavity.

This condition is not a hernia of the umbilical cord, for in the presence of this defect no cord precedes its formation, no cord existing until the confines of the tumor have been passed. It lies, a mass upon the abdominal wall of the newborn, covered by glistening amnion which meets the abdominal skin in a sharp contact of immediate and complete demarcation. Within this enclosure lie vascular elements and a golden-yellow layer of compact Wharton's jelly,

*Abstracted from a paper read by invitation, before the New York Obstetrical Society, May 12, 1925.

loosely applied about a peritoneal sac, most frail and delicate, within which, usually adherent, may lie any viscera of the chest, abdomen, or pelvis.

PERSONAL CASE REPORT

The investigation resulting in this paper was inaugurated by my experience with Case No. 8701, Lawrence Hospital, January 22, 1924. In the eighth month of her pregnancy I was consulted by a disciple of Christian Science who had been delivered of a normal boy before embracing this faith. She was water-logged, toxic to an alarming degree, and I accepted her care with trepidation. Admitted to the hospital, she had a precipitate labor, delivering herself of a six pound boy on a stretcher while being hurried to the delivery room. Her long, thin, tumultuous infant presented at the umbilicus a grapefruit-shaped tumor 10 cm. in diameter, containing intestinal coils, gall bladder and part of liver with the general appearance noted above. Three hours after birth a plastic operation was accomplished almost without anesthesia and in spite of extensive visceral manipulation following straining, which almost emptied the abdomen of its content, the patient left the operating room in splendid condition. For forty-eight hours there was neither distention nor vomiting. Bowels moved naturally, water was taken every three hours, lips and tongue were pink, soft, and moist; there was no temperature elevation, and the baby was apparently comfortable. At fifty hours, it suddenly became cyanotic and died.

On several occasions it has been shown that congenital hernia at the linea alba is an expression of physical inferiority very likely to be associated with cardiac and other defects.

TECHNIC

When an anesthetic is to be given, chloroform is first choice, but much difficulty may result even from its administration. The abdomen and mass is coated with 5 per cent picric acid in 95 per cent alcohol, having an assistant hold the infant's legs. In the absence of anesthesia it is surprising to find scant evidence of pain during an encircling skin incision made close to the amnion. Working from this incision towards the mass, the skin is freed from the underlying tissue until the skin amnion contact is reached and its underlying structure found wire-like in resistance, purse-string in placement. This is to be cut across, resulting in immediate release of tension (but not until infant's sensory apparatus has been clouded, this being a sensitive area). The amniotic hood with its attached narrow selva of skin is peeled off, exposing the underlying jelly coat. This gives way before pressure of the gloved finger, leaving an irregular oval area of variable size where only peritoneum covers underlying coils of bowel and protruding viscera. If, without opening the peritoneum, the hernia can be reduced and the rectus fascia—a structure of real strength at birth—can be grasped, sutured, and approximated, operative result is likely to be satisfactory. At this stage straining may necessitate continued use of chloroform, particularly if the peritoneum is to be opened, an essential step in the presence of adhesions. The abdomen is so small that straining may

result in eventration, great difficulty being encountered in replacement. Adhesions may be so dense (this applies particularly to liver protrusions) that sacrifice of part of this organ, even a considerable part, may be imperative. Every reasonable effort must be made to reduce and cover the mass, despising nothing available for retaining or protecting planes, utilizing, if necessary, homologous grafts, thus acknowledging the unestimated and immeasurable power of young tissue for survival.

I have had an opportunity to operate extensively on two very small infants, one premature weighing three pounds, another premature weighing six, and I have been impressed with the utter indifference of these immature forms to physical insult. After-treatment has presented no problem, these patients being easily handled when the wound area is adequately protected and supported. They are so obviously comfortable whether bottle or breast fed, one must conclude pain perception to be of the lowest grade, apperception all but absent, while reconstructive tissue changes occur with amazing speed. The mortality is approximately 30 per cent.

(For discussion see page 120.)

THE RELATION OF BLOOD SEDIMENTATION TO PELVIC DISORDERS

BY THOMAS H. CHERRY, M.D., F.A.C.S., NEW YORK CITY, N. Y.

WHEN blood is drawn from the vein of a patient and to it is added an anticoagulant, the red blood cells settle by gravity to the bottom of the testing tube. The rate of settling, or sedimentation, has been noted to differ in health and in disease. Numerous contributions to literature, largely European, concerning this test have been made during the last twenty years. Many experiments have been made and theories have been expounded in attempts at explaining why the rate of settling should vary under different physical conditions. A study of the vast literature and what has been definitely demonstrated by physiologists, would seemingly show:

1. That the red blood cells, being heavier than the plasma, gravitate.
2. Any condition disturbing the balance between these two elements would unquestionably interfere with the rate of speed at which settling took place.

If the plasma becomes more concentrated by an increase in its solid elements the red cells gravitate more slowly. If the hemoglobin of the red cells is diminished, rendering them lighter in weight, a slower sedimentation takes place. This is well demonstrated in secondary anemia. An increased rate of settling transpires if the plasma becomes more liquid or if the hemoglobin of the red cells is relatively increased.

In pernicious anemia, the sedimentation time is much faster than normal, which seems to bear out this theory.

In order to understand this change in the fluid and formed elements of the blood stream, one is led into the realms of experimental biochemistry to ascertain whether the settling of the erythrocytes may be influenced by changes in the viscosity of the plasma, a disturbance in the electric conductivity between the plasma and erythrocytes, or the increase in the agglutination of the red cells, promoting their rapid rouleaux, or clumping formation. Let it be sufficient to say that there are many biochemical changes continually taking place in the human mechanism, both in health and disease, that influence the rate and time of erythrocytic sedimentation.

One can readily understand that a wide variation in opinions might easily occur, when it is considered that the component elements of the blood entering actively in this test are subject to great flexibility and rapidly changing biochemical conditions. The blood is never still during life, neither is it constant in composition, as it is influenced by exercise, rest, food, drink, sleep, and diseased states,—all of which may be factors in causing these conflicting opinions. It would seem that a sedimentation of one hundred and fifty minutes or over could be classed as normal in healthy individuals.

Fahreus, and later Linzenmeier, observed during the pregnant state an increased speed of sedimentation and attempted to utilize it as a diagnostic agent. At times it becomes necessary to differentiate normal pregnancy from uterine myomata, tubal gestation, ovarian tumors, and incomplete abortion. The sedimentation time among these groups has been so similar and inconstant among the few cases I have done, that it was of no diagnostic aid (Table I).

TABLE I

RELATIVE VALUE OF SEDIMENTATION TIME IN CASES OF PREGNANCY, FIBROMYOMA, ECTOPIC PREGNANCY AND INCOMPLETE ABORTION

SEDIMENTATION TEST, MINUTES	
Pregnancy	35- 70
Incomplete Abortion	38- 70
Fibromyoma	25- 70
Tubal Pregnancy	35-100

While visiting various European clinics several years ago, I was much impressed by the dependence placed upon the sedimentation test in pelvic infections as a diagnostic and prognostic aid. Following the teachings of Linzenmeier, they considered as an active infection a sedimentation time of thirty minutes or less, and a latent infection one of sixty minutes or less; therefore, any operative procedure deemed necessary is postponed until the test is well over sixty minutes. Friedlander does not operate upon pelvic infections until the

sedimentation time is two hours (one hundred and twenty minutes), and considers it of more value in determining the time of the procedure than the leucocyte count, temperature, or clinical findings.

At the Harlem Hospital, New York, where 40 per cent of the gynecologic patients have some form of adnexal disease, it has been our policy to place considerable dependence upon the leucocyte count and temperature as an indication of the degree of infection. We group these patients according to whether the count is under 16,000 as signifying a mild infection, or an active infection when the count is above 16,000. We do not hesitate to operate upon the first group, if their temperature becomes normal and remains so for three to five days, provided the clinical findings are such as to justify it.

Among the second group, we prefer to await the subsidence of the temperature and a definite lowering of the leucocyte count to 16,000 or less, before surgical intervention is undertaken; however, in certain progressive inflammatory conditions such an interval is not observed, and operation is performed with leucocytes still high.

In a series of 628 patients who had abdominal sections performed for adnexal disease, 508 had leucocyte counts of 16,000 or less. Among this group there was a mortality of 4.1 per cent and an average morbidity of 17.8 days. There were 120 patients whose leucocyte counts were above 16,000. This group had a mortality of 16.6 per cent and an average morbidity of 18.5 days.

These results definitely show that the leucocyte count is a dependable agent in determining, to a certain extent, the degree of infection.

In order to ascertain whether the sedimentation test was more dependable than the leucocyte count in pelvic infections and the relative value of each as a prognostic indicator, 71 patients were closely observed both pre- and postoperatively. Twenty-six of these patients were operated upon with removal of their pelvic lesions, consisting of tubal and tuboovarian abscesses. The sedimentation time in all was under thirty minutes. The leucocyte counts averaged 13,250. No deaths occurred and the average morbidity was 18.2 days.

TABLE II

GROUPING SEDIMENTATION TEST IN OPERATIVE CASES OF ADNEXAL DISEASE

GROUPS SEDIMENTATION TEST	NUMBER CASES	AVERAGE LEUCOCYTE COUNT	AVERAGE MORBIDITY IN DAYS	DIED
10-20 minutes	16	13,345	19	0
20-30 minutes	10	13,210	18.6	0
Total	26	13,277	18.8	0

Another group of 29 patients was operated upon with pathology similar to the preceding group. Their sedimentation time was between thirty and sixty minutes, with a leucocyte count averaging 10,200. No deaths occurred. The average morbidity was sixteen days.

TABLE III

GROUPING SEDIMENTATION TEST IN 29 OPERATIVE CASES OF ADNEXAL DISEASE

GROUPS SEDIMENTATION TEST	NUMBER	AVERAGE LEUCOCYTE COUNT	AVERAGE MORBIDITY IN DAYS	DIED
30-40 minutes	14	10,260	18	0
40-50 minutes	9	10,150	15	0
50-60 minutes	6	10,200	15	0
Total	29	10,205	16	0

In these two groups, totaling 55 patients, the sedimentation time in 26 patients indicated active infection, and in 29, active and latent infection; therefore, according to Linzenmeier, they should not have been treated surgically. The leucocyte count was only slightly above normal in the entire 55 cases, which seems, in view of the results, to have been of more value in estimating the degree and virulence of the infection.

Sixteen patients with the same pelvic pathologic lesions were also operated. Their sedimentation time averaged from sixty to one hundred and ten minutes. The leucocyte count averaged 10,400. One patient whose sedimentation test was sixty-eight minutes and who had a subacute appendicitis accompanying the pelvic infection, died on the ninth day from a general peritoneal infection. The average morbidity was eighteen days.

TABLE IV

GROUPING SEDIMENTATION TEST IN OPERATIVE CASES OF ADNEXAL DISEASE

GROUPS SEDIMENTATION TEST	NUMBER	AVERAGE LEUCOCYTE COUNT	AVERAGE MORBIDITY DAYS	DIED
60-70 minutes	8	10,000	20	1
70-80 minutes	2	13,300	16	0
80-90 minutes	3	11,600	16	0
90-100 minutes	1	9,000	14	0
100-110 minutes	2	10,500	24	0
Total	16	10,880	18	1

It would appear from the foregoing data that in the series of 71 operative cases having adnexal disease, the sedimentation time was extremely fast (55 being under sixty minutes) to have registered such a mild degree of infection as results of the operative procedure demonstrate. On the other hand the leucocyte count indicated mild or subsiding infections, as the gross pathology and operative results prove. It would seem that the leucocyte count in this series was of more value in estimating the degree of infection than the sedimentation time.

In the entire 71 patients, following the removal of the pelvic pathology, the sedimentation time increased from five minutes in the slower counts to thirty minutes in the faster ones. As there was no evidence of infective foci in other parts of the body, we can assume that the pelvic inflammatory processes produced the change in the blood stream sufficient to give the reactions of sedimentation above recorded.

It might not be amiss to give a résumé of the following case report in order to illustrate the comparative value of the leucocyte count and sedimentation test as a diagnostic agent.

Mrs. S. upon whom two previous laparotomies had been performed, had acquired an incisional hernia of moderate size. She had also a uterine fibroid tumor (4 by 6 cm.) and a cystic right ovary, both of which apparently were producing typical symptoms. At operation, upon dissecting free the adherent loops of gut from the sac, the intestine was accidentally perforated in two places. An enterorrhaphy was done and the pelvic lesion removed. An overlapping repair for the hernia was executed. The abdomen was closed without drainage. A rubber tissue drain, however, was inserted subcutaneously through the lower angle of the incision. This patient was watched with considerable anxiety, for while there was no soiling of the peritoneal cavity by intestinal contents, experience has shown that accidental wounds of the small gut are attended with a high mortality. The patient reacted well for forty-eight hours when there was a rise of temperature to 103° F. accompanied by increase in vomiting, abdominal pain and distention, with considerable physical depression. For the next twenty-four hours this condition continued and a general peritonitis was believed to be present. At this time the sedimentation test showed a fifteen-minute reaction; the leucocyte count was 12,200 with 67 per cent polynuclears. Gastric lavage and enemas were administered, the temperature dropped to normal, and there was reduction of all abdominal symptoms; an uneventful recovery without wound infection ensued.

This case is related as an illustration of how the sedimentation test can cause unnecessary alarm and that the leucocyte count was the dependable factor in differentiating a dynamic ileus from a general peritonitis.

Another group of 39 patients having adnexal disease was not operated upon. Only conservative therapeutic measures were administered—rest in bed, hot vaginal douches and diathermy. The sedimentation time ranged from twenty to ninety minutes. The leucocyte count in 35 patients was below 16,000; in 4 it was above 16,000. One patient had a leucocyte count of 54,000 (3 counts made by different men), a sedimentation time of thirty minutes, and a temperature of 104° F. She had two large, adherent, tender pelvic masses that were reduced by diathermy in three weeks time, with a gradual reduction of the leucocyte count and a rise in the sedimentation time.

TABLE V

GROUPING SEDIMENTATION TEST AND LEUCOCYTE COUNT IN 39 NONOPERATIVE CASES OF ADNEXAL DISEASE

Leucocyte Count	Up to 16,000	35 Cases
	Above 16,000	4 Cases
Sedimentation Test	As a Group	20-90 Minutes

SEDIMENTATION TEST IN OTHER GYNECOLOGIC CONDITIONS

In order to observe the sedimentation time in patients with pelvic conditions, 14 patients with fibromyoma were tested. In 9 patients

the end reaction was less than thirty minutes, and in 2 it was below sixty minutes. The leucocyte count of these patients were all under 13,000. Most of these patients at operation presented, besides their fibroid tumor, an adnexal inflammation of some kind, but not of such an active form, however, as to account for the rapid time of settling. One exception was in a patient who had eighteen minutes sedimentation time, probably due to a mild pyelitis. One patient in this group died on the fourteenth day from pulmonary embolus. Four other patients had tests above sixty minutes.

There were 4 tubal pregnancies that gave a sedimentation time from thirty-five to one hundred minutes.

Incomplete abortions varied from thirty-eight to seventy minutes. Early pregnancies averaged fifty to sixty minutes in their sedimentation time; late pregnancies from thirty-five to forty-five minutes.

In 2 patients who had advanced cancer of the cervix and extensive metastases, the sedimentation time was fifteen and sixteen minutes. Both had leucocyte counts above 16,000. They died on the fourteenth and thirty-fifth day following their admission, having had palliative treatment only. Three other early cervical cancers showed a sedimentation time of thirty, thirty-five and fifty minutes, respectively.

One cyst adenocarcinoma of the ovary that was impacted, followed by gangrene and perforation, presented a ten-minute sedimentation time with a leucocyte count of 21,000. An uneventful recovery resulted in this case subsequent to operation with the exception of a slight wound infection.

Two young patients having uterine bleeding from an indefinite endocrine disturbance had a secondary anemia. One patient had a 22 per cent hemoglobin with a sedimentation time of eighteen minutes. Her hemoglobin index, however, was +1. The other patient had 78 per cent hemoglobin with a -1 index. Her sedimentation time was two hundred minutes. This bears out the theory of the change in concentration of the plasma and the weight of the red blood cells being increased or decreased by the hemoglobin content.

There were 13 patients upon whom plastic operations and laparotomies for retrodisplaced uteri were done. In 4 of these the sedimentation time was under sixty minutes; the others were above sixty minutes, one hundred minutes being the slowest. The immediate operative results were satisfactory.

SUMMARY

That the sedimentation time of the blood is a simple test, readily performed is unquestionably true. The rate of sedimentation, however, is easily influenced in diseases by absorption into the general circulation of unknown substances that produce a change in the chemical and physical balance of the blood elements. This balance is no doubt

readily upset, and this is especially so in all types of infection, thus rendering it a most delicate indication of the invasion of the human organism by disease. This is manifested by an increase in the speed of settling of the red blood cells, that responds to infection much more quickly than the increase in the number of leucocytes.

The increased rate of sedimentation does not, however, indicate the degree and virulence of the infection as shown in the 71 cases of adnexal infection reported above; neither from the observations made, does a low sedimentation time signify a bad prognosis. However, a steady lowering of the time means an increasing toxemia that may terminate fatally, yet it would be unwise to base a prognosis upon this one test unless substantiated by other reliable clinical manifestations.

As a diagnostic agent alone, it is untrustworthy in pelvic conditions, yet it may aid in influencing an already doubtful position to one that is more tenable.

In pelvic infections the leucocyte count, while not so readily affected or delicately influenced as the sedimentation time, is for this reason a more reliable indicator of the degree and virulence of the infecting organism, and, therefore, more dependable as a means to determine the most suitable time to interfere surgically.

REFERENCES

- Fahreus: *Hygiea*, 1918, *Biochem. Ztschr.*, 1918, lxxxix; and *Hamb. Phys., Tagung.*, 1920.
Friedlander: *AM. JOUR. OBST., AND GYNEC.*, 1924, vii.
Linzenmeier: *Zentralbl. f. Gynäk.*, 1920, xlv; *ibid.*, 1921, xlv; *ibid.*, 1922, xlvi; *Arch. f. Gynäk.*, 1920, cxiii; *München. med. Wchnschr.*, 1923, lxx.
Hammarsten, Hedin, and Mandel: *A Textbook of Physiological Chemistry*, Jno. Wiley Sons, 1916.

580 PARK AVENUE.

REPORT OF A CASE OF DECIDUAL REACTION IN ADENOMYOMA OF RECTOVAGINAL SEPTUM

BY RICHARD JOSEPH WHITE, M.D., FORT WORTH, TEXAS

THE following case, while not unique, is of sufficient rarity to excite general interest.

The patient, N. F., aged twenty-seven, married 6 years, was admitted to St. Luke's Hospital, New York City, August 9, 1921, on the service of Dr. Frank S. Mathews to whom I am indebted for the privilege of reporting the case.

Chief Complaint.—The patient had had backache for a year and a half with pain radiating down the legs which was exaggerated by standing. She had had one child and one miscarriage. Her last period was June 29. Periods were regular every twenty-eight days lasting, as a rule, three days; not profuse, but accompanied by severe backache.

Examination showed a poorly nourished woman in whom physical findings were essentially negative. Pelvic examination showed the cervix large and soft, and the fundus large and moderately retroverted. The posterior fornix showed a rough, warty plaque about 4 by 2.5 cm. in area, slightly elevated, situated in the midline with its long axis in the axis of the vagina, which looked very much like an area of beef tongue. Rectal examination showed the mucosa of the bowel uninvolved but the nodule easily palpable through the gut wall. It felt hard and nodular, like cicatricial tissue. She had been examined elsewhere and told that she had a cancer of the vagina. The cervix was smooth and without ulceration or erosion, and, because of the uncertainty of the diagnosis and the fear of disturbing a pregnancy, she was discharged to return in a month for further observation. She returned very much worried, and chiefly to relieve her mind and establish a diagnosis, the growth was removed.

Operative Note.—In the posterior fornix, just at the reflection of the vaginal mucosa from the cervix, and extending down on either side of the midline, was a papillomatous, more or less edematous looking growth, extending into the vaginal submucosa, but not into the rectum or cervix. It did not appear clinically malignant. The growth was removed in two or three pieces. The defect in the vaginal wall was sutured with catgut. She was having an uneventful convalescence with pregnancy undisturbed at time of her discharge.

As to the subsequent course, unfortunately nothing whatever is known, as the patient never reported to the follow-up department and our visiting nurses were unable to locate her at the address given the hospital.

Pathologic Report by Dr. L. C. Knox, resident pathologist St. Luke's Hospital. The specimen consisted of several small pieces of tissue from the cervix and vaginal wall. The largest was irregular, showed several small cysts, was fairly firm, and suggested tumor. Microscopically the section showed a small amount of smooth muscle and an irregular area of glandular tissue. The glands showed a tendency to become cystic, were lined with low cuboidal epithelium, and were surrounded by a small mass of flat cells which very closely resembled the uterine mucosa as it appears in the early months of pregnancy. This periglandular stroma was penetrated by dilated vascular sinuses, and hemorrhagic areas were frequent. These areas had broken into the lumina of the glands and contain fresh blood. There was a proliferation of the fibroblasts about the entire glandular area, and

a considerable area of round cell and polymorphonuclear infiltration. This was to be regarded as aberrant uterine mucosa undergoing the decidual reaction of pregnancy. *Diagnosis:* Decidual reaction in aberrant endometrium in the vagina.

The views of the earlier writers on this subject have recently been summarized by Winestine.¹ She states that Pick, particularly in the earlier investigations which he made of the subject, believed that these growths arose from the mesonephros. Herly,² in a recent article, shows some illustrations from Pick's early writings by which he demonstrated his ideas of the origin of misplaced endometrial tissue from what he calls pseudoglomeruli. Pick later gave up this view, according to Winestine, and came to believe that its true origin was from the superficial epithelium of the plica urogenitalis. Other writ-

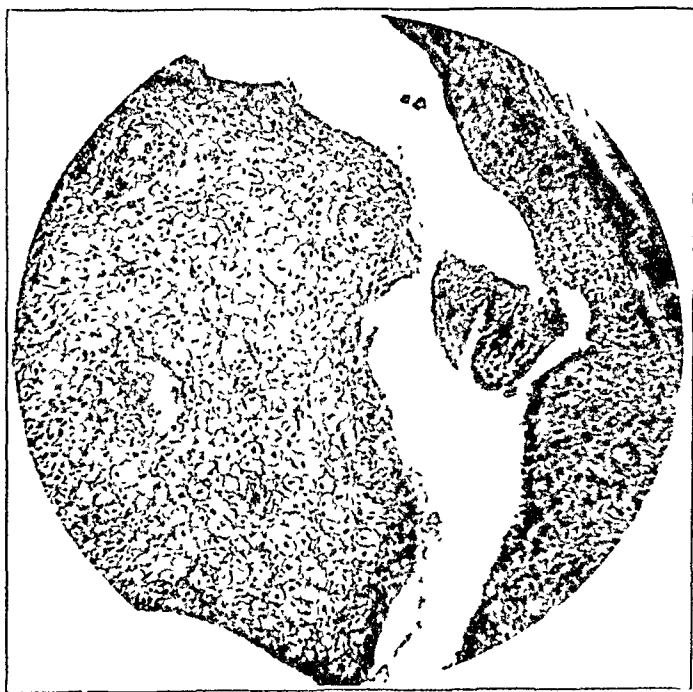


Fig. 1.—Photomicrograph of area of tumor showing typical decidual cells.

ers have thought that such of these growths as were found in the celomic cavity might be attributed to a metaplasia of the mesothelial cells perhaps under the influence of chronic inflammation. Cullen is generally credited with the idea that these growths are derived from transplanted endometrial fragments. Sampson³ has been the most prominent recent advocate of this view. Sampson⁴ states that he has observed endometrial implants on the ovary in 45 out of 296 operations for pelvic disease in one year, and many others elsewhere in the pelvis and on the pelvic coils of intestine during the same period.

The most convincing evidence that endometrial tissue can be transplanted is the occurrence of adenomyoma in the abdominal incision following the opening of the uterine cavity or even the passing of a needle deeply through its substance and then through the abdominal

wall, as in ventral fixation. Cullen⁵ reports three cases: one following an adenomyomectomy of the uterus and two following a cesarean section. Sampson⁴ refers to a fourth case reported by Mallory, in which an adenomyoma developed in the abdominal incision several years after cesarean section. Nine additional cases arising similarly have been recently reported by Lemon and Mahle⁶ of the Mayo Clinic.

Jacobson⁷ has proved that this tissue can be implanted in animals, by opening the uteri of rabbits, removing fragments of endometrium, leaving them in the abdominal cavity and finding at later autopsies that the seeds had taken root and grown to form small tumors of endometrial tissue.

Their occurrence in the wall of the uterus may possibly be explained by the limited invasive power which this tissue is known to possess, particularly in the presence of a low grade chronic inflammation. The only real difficulty in this hypothesis is how to explain the occurrence of adenomyoma in the inguinal canal along the course of the round ligament.

The origin of these growths in the rectovaginal septum is the point of greatest interest in this case. Certain extensive ones that have invaded the bases of the broad ligaments have been thought to have been originally implants in the culdesac which have burrowed through. The intimate relations of the developing vagina and uterus to their embryologic ancestors, the müllerian ducts, is well known, and it is quite conceivable that a fragment of endometrial tissue might become displaced into the portion of the duct destined to form the vagina, thus giving rise to adenomyoma of the rectovaginal septum. On the other hand, in the light of the established fact that implantations do so readily occur in the peritoneum, it seems sensible to infer that adenomyomas of the septum may originate as implantations also. Of course the squamous epithelium of the vagina, in the intact state, is highly resistant to any type of injury and presumably to implantation. However, after an injury or abrasion sufficient to break the continuity of the epithelium, if menstruation were in progress at that time, there might be lodged on the raw spot a fragment of endometrial tissue extruded with the menstrual blood, which, taking root there, might manifest invasive powers of a greater or lesser degree and grow to the size of the tumor in the case cited, or even larger. Herly,² evidently impressed with the implantation theory, reports two cases of his own and mentions a third, recently seen in consultation, that developed adenomyoma in the septum following high forceps delivery with laceration and immediate repair. These, he suggests, may have developed from inclusions of endometrial tissue at the time of suture.

The case reported presents two points of special interest. First, the diagnosis: Our patient had been badly frightened by being told that she had a cancer of the vagina. There seemed no justification

for this diagnosis but it will serve to illustrate how little was known about these growths three or four years ago, for the attending staff failed to recognize the condition and could only say, correctly as the event proved, that they considered it nonmalignant. Herly² states that adenomyoma of the septum has been mistaken for hematocele, pelvic abscess, cancer of the rectum, and adherent adnexa in the pouch of Douglas. Our case resembled none of these.

Second, decidual reaction: Perhaps the most interesting feature of all was the decidual reaction. I have tried to present the evidence gathered by other men, tending to show that these tumors have the same structure and function as normal endometrium. That they menstruate or make abortive efforts in that direction has been shown by many authors, and the blood, old and fresh in the stroma and lumina of the glands, in the case reported is but one more illustration. Decidual reaction in these tumors has been reported, of course, but is still rare enough to excite interest. The cases of Cullen, Griffith, and Winestine are examples. There is every reason to suppose that there is decidual reaction in all these tumors in pregnancy with one possible exception. Sampson⁴ holds that some of the peritoneal implants take their origin from the extruded tubal mucosa. If this be true, we would not expect decidual reaction in them because, though there is decidual formation in the immediate vicinity of the ovum in ectopic pregnancy, there is no tubal decidual reaction in a normal uterine pregnancy. The reason there are so few cases of decidual reaction on record is not, I believe, because of their actual rarity but because of the infrequency with which surgery provides material for pathologic study during the course of a pregnancy. The condition is an excellent example of a hormone or chemical agent acting at a distance.

REFERENCES

- ¹Winestine, Fredrika: Arch. Surg., May, 1924, p. 625.
- ²Herly, Louis: Surg., Gynec. and Obst., November, 1924, pp. 626-635.
- ³Sampson, J. A.: AM. JOUR. OBST. AND GYNEC., November, 1922, iv, 451-512.
- ⁴Sampson, J. A.: Surg., Gynec. and Obst., March, 1924, pp. 287-311.
- ⁵Cullen, T. S.: AM. JOUR. OBST. AND GYNEC., November, 1922, p. 562.
- ⁶Lemon, W. S., and Mahle, A. E.: Arch. Surg., January, 1925, pp. 150-162.
- ⁷Jacobson, Victor C.: AM. JOUR. OBST. AND GYNEC., September, 1923, vi, 257-262.

REPORT OF A CASE OF SEPARATION OF THE DORSAL VERTEBRAE IN PODALIC VERSION AND EXTRACTION

By W. R. BARNEY, M.D., CLEVELAND, OHIO

IN my clinic* the average number of podalic versions and extractions per year is 151. This case represents the first accident of this particular type that has happened here. The available literature states that injuries to the cervical vertebrae are fairly common but that injuries to the dorsal vertebrae are comparatively rare and that when they do occur it is in the lower dorsal vertebrae. In this case the accident occurred in the mid-dorsal region.

History.—A colored primipara, eighteen years old, presented herself at a prenatal clinic March 10, 1925, and was under observation continually till the time of delivery, July 27, 1925. Her last menstrual period was October 16, 1924. Quickening could not be definitely recorded. Her measurements were normal and the blood Wassermann negative. The last time she was seen in the prenatal clinic on July 9, 1925, the breech was in the fundus, the dorsal plane on the left, small parts on the right, head floating, and the fetal heart was heard in the midline.

Labor History.—On July 27, she presented herself at the hospital at 4:00 A.M., and was admitted to the labor room. She said that her pains started at 4:00 P.M. July 26. Shortly after admission the membranes ruptured. External palpation revealed no change from the last findings in the prenatal clinic. Rectal examinations showed dilatation equal to two fingers at 6:30 A.M. At 6:45 A.M. the pains were increasing rapidly in intensity, duration, and frequency, and at this time she was put on morphine-scopolamine routine: Morphia gm. 0.01, and scopolamine gm. 0.00045, by hypodermic at once; scopolamine gm. 0.0003, forty-five minutes later, followed by scopolamine gm. 0.00016, q. 90 minutes. Dilatation progressed satisfactorily but the head did not engage. However, delivery was anticipated in three quarters of an hour; so the scopolamine was discontinued and ether analgesia given during the pains. After three hours in the second stage no progress had been made, the head remaining fixed in the posterior position; and being moulded very well, operative delivery was decided upon.

Operative Procedure.—After examination under anesthesia it was thought that there was no disproportion between the head and pelvis; as the head was not engaged, a version and extraction was decided upon and, under deep anesthesia, was very easily done. Both feet were drawn down and there was some difficulty getting the hips down, although the cervix was fully dilated. Moderate traction, no rotation, was applied directly in the axis of the superior strait and just as the hips were coming under the symphysis something in the baby gave way with a "crack." After the hips were engaged, they slipped through readily, the arms were easily delivered and the after-coming head, being turned to an oblique, came through with practically no effort at all. The operative procedure was not difficult at any stage. The cord was pulsating about 80.

With artificial respirations the heart rate picked up to 130 and the pulse was good. The child would gasp approximately once every thirty seconds with or without artificial respiration. While flexing the thighs on the abdomen definite crepitus was palpated in the upper dorsal region of the spine, although no deformity

*The Maternity Hospital, Cleveland.

was noted. After working three hours it was noted that the respirations were not improving and the mucous membranes were rather pale. Oxygen was used and the baby put into an incubator where the respirations gradually declined and ceased four and one-half hours after delivery.

Autopsy.—The baby weighed 3500 grams and measured 54 centimeters. In the right chest there was a small quantity of free blood. The posterior mediastinum was filled with blood clots, less hemorrhage extending in the prevertebral region up to the fourth cervical vertebra. This extended down in the retroperitoneal region to the third lumbar, while the retropleural hemorrhage extended to the midscapular region from the second to the tenth rib. All the viscera were normal. Along the spinous processes of the vertebrae from D2 to D7 was free blood and the muscles dissected away from their attachments revealed the disarticulation of the fourth and fifth dorsal vertebrae. There was no fracture and no irregularity of the articular surfaces. The laminae were then removed from the lumbar region to the foramen magnum and the spinal canal was found filled with clotted blood from the first lumbar to the third cervical. There was no epidural blood. The meninges were then opened and there was a very slight film of clotted blood from the level of the eighth dorsal vertebra up to and including the cerebellum. There was no hemorrhage in any portion of the cerebrum.

This case is reported because of the rarity of the condition, viz., a separation of the fourth and fifth dorsal vertebrae with no fracture, occurring during an operative delivery in which no undue force was used. The cause of this accident is open to speculation, but it is likely that there was an inherent weakness in the union of the fourth and fifth dorsal vertebrae.

503 OSBORN BUILDING.

Society Transactions

NEW YORK OBSTETRICAL SOCIETY

MEETING OF MAY 12, 1925

THE PRESIDENT, DR. REGINALD M. RAWLS, IN THE CHAIR

DR. THOMAS C. PEIGHTAL (by invitation) presented a paper entitled **Postoperative Parotitis, with a Report of Cases.** (For original article see page 88.)

DISCUSSION

DR. HARBECK HALSTED.—In the last five years at the Sloane we have had six cases of parotitis, divided equally among the obstetric and the gynecologic cases. All of the former were otherwise complicated. There was one cesarean section that developed a cystitis, phlebitis and right parotitis approximately at the same time. The parotitis had to be incised. Shortly after the patient developed pneumonia. Eventually she recovered completely. I might say that with the exception of two bilateral cases all were right-sided. The second obstetric case presented hypothyroidism and some vomiting. The patient had had toxemia with a previous pregnancy. She came into the hospital for anemia and was transfused. The transfusion was followed by true anuria for a few days. She developed rash and within thirty-six hours, a right parotitis which became so massive that it was incised. Although there was no free pus at the time, the gland tissue was described, as necrotic with some necrotic fat tissue over it, and it began to discharge within twenty-four hours after incision. Drainage ceased in about three weeks and the wound healed up shortly after. The third obstetric case entered with vomiting, although the patient was seven months pregnant. She had an enormous hydronephrosis with a double pyelitis. We tried to drain the kidney by catheter, but were not successful, and so induced labor. Twenty-four hours after delivery she developed a right parotitis which progressed to the point demanding incision. The hydronephrosis drained out, the parotid subsided rapidly, and the patient recovered. The baby lived in this case, in the case before it was macerated.

Of the three surgical cases, one was an acute salpingitis, of unknown cause, with a cystic ovary that was removed. The patient developed a right parotitis which had to be incised and a large amount of pus freed. This was the only case that developed facial paralysis, which cleared up in four months. Of the two others, one was a clean retroversion and the other was a tremendously complicated plastic, in which we had to incise both sides. The only one not incised was the retroversion case in which a double parotitis developed. After the application of heat both sides rapidly subsided, and I believe in future we will try applications of heat first.

Out of these six cases, then, five were incised and the six patients made perfect recoveries.

DR. F. R. OASTLER.—Several years ago, in six months, I had seven cases of infectious parotitis following operation. Some of them were cases of septic origin; others were practically clean. It seemed to make no difference. At first I thought

there was something wrong with the anesthesia and we had everything sterilized before giving an anesthetic, but with no better results. Following that, I came to the conclusion that possibly the dry mouth had something to do with it. Therefore, we made it a routine procedure that the day before and the day of operation the mouth should be thoroughly cleansed with an antiseptic and the teeth carefully scrubbed. I am satisfied that the condition came from a dirty mouth in every case which I have personally seen.

One other thing about treatment. Massage of the gland is a mistake, but massage of Stenson's duct I consider of extreme value, gently done every three hours, not touching the gland at all.

DR. H. C. COE.—In twenty years' service at Bellevue Hospital and twenty-five years at Memorial Hospital, I cannot recall a single case of suppurative parotitis, and certainly in the early days we did not trouble much about the teeth or the mouth. The first case I saw was at the Woman's Hospital, where we are exceedingly careful about cleansing the mouth. I had to operate twice on the patient and made a counter-opening in the neck on the left side and incised the other parotid. We could not find any cause for the condition in this case, but it undoubtedly came from the mouth.

DR. HERMANN GRAD.—I have in mind two cases, one at the Woman's Hospital and the other on the outside, associated with a very extensive peritonitis following infection from the introduction of a stem pessary used to prevent conception. The patient also developed an empyema after this, requiring resection of the rib, and about ten days later a right-sided parotitis, with very extensive suppuration. It broke into the external auditory canal and had to be incised.

In the other case the woman had a uterine suspension done, and developed a mild septic condition, which was followed by extensive suppuration of the right parotid gland.

DR. E. C. LYON, JR.—At the Woman's Hospital on the obstetric service occasionally, we see a case of parotitis, but as yet we have not had one that went on to suppuration.

In my own practice, I had one case of mild parotitis following pernicious vomiting, in which therapeutic abortion was done.

DR. FREDERIC C. HOLDEN.—As regards the Bellevue Hospital service, I would like to add that in the last 2,000 gynecologic operations we have had no postoperative parotitis. We have had quite a number which developed in the postabortal and postpartum service. Many of these people have very poor oral hygiene.

DR. PEIGHTAL (closing).—If there is any doubt at all, an incision should be made as the given mortality in this condition is rather high (33½ per cent).

I was interested to hear Dr. Oastler had been using preventive measures for almost three years and that some improvement resulted in the number of cases. I quite agree with him that it is not a good practice to massage the gland. I merely mentioned that point because it had been brought out by several authors. I think that massage of the duct in an attempt to open it and get drainage that way, especially in the early and mild cases, is a very important point.

Having looked over the literature and seen these cases at Roosevelt Hospital, at least five of which I saw personally, I cannot help but feel that the etiology of this condition lies pretty much within the mouth and that the organisms lying in the mouth and in Stenson's duct cause this process, and that the reason they extend up into the gland and out through the perilobular tissues is usually because the duct has been plugged.

I was rather interested to hear about Dr. Lyon's case of pernicious vomiting. The case I mentioned that Manton spoke of also had a therapeutic abortion.

I want to bring out one point. Deaver in 1915, stated that he felt the anesthetic in a large measure was a very definite factor in some of these cases, but almost immediately thereafter a number of men all over the country refuted that statement, especially men who had public hospital services, where practically the great proportion of their patients were alcoholics but found no increased incidence of this complication.

DR. H. C. WILLIAMSON presented a paper entitled **Application of the Forceps to the Transverse Head for Delivery of Persistent Occipito-posterior Cases.** (For original article see page 37.)

DISCUSSION

DR. H. C. WILLIAMSON.—I would like to say in response to Dr. Davis that episiotomy is not done as a routine. In some of the cases of difficult forceps, by doing an episiotomy and allowing the handles of the forceps to drop back, they come out very much more easily.

DR. H. R. CHARLTON (by invitation) presented a paper entitled **Massive Congenital Hernia at the Linea Alba and Its Immediate Treatment.** (For original article see page 103.)

DISCUSSION

DR. H. B. MATTHEWS.—My own case apparently was one of patent omphalomesenteric duct in which the ileum—and perhaps jejunum had remained and become adherent so that, when I cut and tied the cord, the small gut was included in the tie. The case in question was a perfectly normal spontaneous labor occurring at the Long Island College Hospital. Four or five days later the baby developed all the symptoms of intestinal obstruction and died. Autopsy showed where we had cut and tied the ileum and this was the cause of the obstruction. The cord looked perfectly normal; you could not have told that there was any ileum in it by external or any other examination.

DR. J. A. HARRAR.—The thing which surprises me most, is the infrequency of this condition as reported. At the Lying-In Hospital where we have a service of between 5000 and 5500 cases a year I am sure we have three or four of these in every 5000 deliveries. Dr. Ballantine calls them gastrectasis, perhaps two-thirds of those are of so extensive a nature that the liver and the entire abdominal contents are in the sac.

I had one case several years ago where the opening was about two inches across. The baby was premature and I did not feel it would stand operation. By the use of sterile gauze and pressure over this area, in a few days it gradually contracted and when the baby was about to be discharged at the end of the second week it looked not unlike an ordinary umbilicus. In the smaller hernias it is possible to cure the condition without operation, although operation is the method of choice.

DR. CHARLTON (closing).—The type of case which Dr. Matthews described where the ileum is in the sac, has several times been reported and before tying off any cord, its proximal portion should be carefully inspected. If there is any bulging it is advisable to tie well away because retraction will go on.

So far as Dr. Harrar's statement of the frequency of this condition is concerned, De Lee remarked in his note to me that they also had frequent cases of gastrectasis, but that is a different type. That is one of the split formations comparable above to the same abdominal congenital fissure below.

I meant this paper particularly to cover those operable conditions in and about the site of what would have been the umbilicus.

DR. MEYER ROSENTOHN (by invitation) presented **An Analysis of Cases in the Service of the Lying-In Hospital.** (For original article see page 96.)

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

New Books

BY ROBERT T. FRANK, A.M., M.D., F.A.C.S., NEW YORK CITY

Seelig¹ has presented us with a most charming and readable outline of the history of medicine. Any one whose interest in the history of medicine fails to be permanently aroused by this lifelike resurrection of past epochs may be classified as hopeless. Even the most blasé and matter of fact medical student, who lives solely for and in the prospect of a lucrative practice, may be stirred. The book is a real achievement in that it elevates a subject which can be presented in a cut and dried manner, into the absorbing and gripping present.

Flexner² has long since, although a layman, earned the distinction of being an expert on the subject with which he deals. The book is not only worth while because of its excellent method of presentation, but also because of the exhaustive fashion in which the entire field of secondary education, premedical training, and medical education is dealt with. Science, as Flexner puts it, is essentially a matter of observation, inference, verification, and generalization. Throughout, the author emphasizes the similarity of the practitioner and investigator when both are actuated by the proper spirit.

"Medical education must be conceived as primarily the effort to train students in the intellectual technic of inductive science" and Flexner traces this medical education from beginning to end. "Scientific medicine in America—young, vigorous and positivistic—is today sadly deficient in cultural and philosophic background."

The French and English emphasize the clinical side of medicine. Lately in England so-called "teams" have become the fashion. In Germany, the true university idea of medical education has been most fully developed. German medical science appears to have reached its zenith in 1910. Since then it has either stood still or gone backward, because the war has administered a serious check to university medicine in Germany.

He deals in great detail with secondary education in the various countries. In Germany, such secondary education is continuous, carefully planned, and scrupulously carried out, so that the medical students in that country form an even, well-rounded group. In England, selection of the student body is less careful, but the English teachers concentrate their efforts upon the brilliant and efficient student, pushing

¹Medicine, An Historical Outline. By M. G. Seelig, M.D., Williams & Wilkins Company, Baltimore, 1925.

²Medical Education, A Comparative Study. By Abraham Flexner. The Macmillan Company, New York, 1925.

the less promising material to the side. In America, the student groups are often gathered haphazardly, with today a tendency of selecting the student body "from the right sort of people" frustrating many worthwhile students because they come from "the wrong people." This often produces a serious social loss because superior opportunities are lavished upon the stupid or indolent for no other reason than that they are of "the right sort." In the United States it is often the case that a student is valued highly because he is a good fellow rather than a good scholar. Flexner says, "The truth is that, until high school and college do their job better, the medical school cannot find a homogeneous group at the proper level."

Three types of medical schools are described: (1) the clinical type, characteristic of France and England of today; (2) the university type of which the German university medical schools are the best example; and (3) the proprietary type once flourishing in this country but now happily obsolete.

The author enters fully into the function of the outpatient departments as adjuncts and feeders of the medical school. He deals with the university hospital and its partial substitute, hospitals more or less connected with the university by means of special arrangement and teaching staffs. He compares the English apprentice system with the French methods, deals with judgment and leniency with the makeshift American system of part-time instructors, but appears to favor the full-time university professor as exemplified by the German universities.

The immense amount of detail in this instructive volume is handled with wonderful dexterity. I only regret that Flexner did not see fit to summarize his generalizations and perhaps to indicate more clearly what he considers the proper mode for future development along safe and sane lines.

GYNECOLOGY

Three entirely dissimilar books treating of the same subject from different points of view are *Gynecological Operations* by Franz, the third edition of Crossen's *Operative Gynecology*, and the fifth edition of Döderlein and Krönig's *Operative Gynecology*.

Franz's book³ may be described as his surgical autobiography. Franz, who is now director of the University Woman's Clinic, Charité, in Berlin, incorporates the result of his gynecologic work both in Jena and Berlin. The results embrace 6114 operative cases. The book is an atlas of operative technic, as well as a brief but vivid collection of case histories. Most of the illustrations of the operative field were obtained by color photography. On the opposite page there is a line drawing of the photograph with descriptive captions. Except in a few pictures, where the vivid red overshadows and obscures the outline, the color process has proved both artistic and instructive in its results.

Franz is a writer whose style is unassuming and yet incisive. His introduction emphasizes that the operator should realize that operation in itself is not infallible and that operation should not be overvalued; that in making indications, the disease should be more dangerous than the operation; that it is impossible to be both general surgeon and gynecologist. He modestly confesses that he has considerable difficulty in keeping abreast of gynecology alone.

³Gynaekologische Operationen. Von Dr. Karl Franz. Verlag von Julius Springer, Berlin, 1925.

The book is so replete with valuable facts that I do not hesitate to abstract it at some length. The operator uses rubber gloves over which cotton gloves are drawn,—an unnecessary complication in my opinion. His peritonitis statistics are not encouraging, 49 operations with 24.5 per cent recoveries. In the statistics of spinal anesthesia, 6015 cases show 7 cases of meningitis. He does not use this method for the very old. I am pleased to see that Franz prefers the Alexander-Adams operation and that he employs it to bring forward the uterus even when the abdomen has been opened for intraperitoneal manipulations. For prolapse he uses anterior and posterior colporrhaphy combined with the Alexander operation. He has long since discarded hysterectomies in cases of prolapse. Most of his abdominal work is done through the transverse Pfannenstiel incision. To my surprise, he punctures both malignant and nonmalignant ovarian cysts to facilitate their removal. His attitude towards inflammation of the adnexa, with the sole exception to be mentioned, is most praiseworthy. Of 847 inflammatory cases, only 45 were operated. On the other hand, he operates at once on tuberculous adnexal tumors and tuberculous peritonitis. This appears a grave mistake to me, and his statistics of 23 operations with 4 fatal outcomes, does not lend support to his attitude. Like all well-trained gynecologists, Franz admits that the diagnosis of ectopic pregnancy is not always easy. He has had 255 ectopic cases and 17 exploratory laparotomies for ectopics, where none were discovered. This large number of explorations is due to the fact that Franz refuses to perform an exploratory puncture. Of 3176 myomata of the uterus, 1141 were operated upon, that is, he operated on 35.6 per cent of the cases and radiated 19.4 per cent. His operative mortality was 2.1 per cent. Among the myoma operations, 9 proved to be sarcomatous, and in 12, corpus carcinomas were discovered. Franz has continued to operate upon carcinoma of the cervix and only uses radio therapy when the condition is inoperable. Eighty-two per cent of his cases proved operable. Franz has 800 Wertheim operations to his credit. From 1905 to 1909 the mortality was 19.9 per cent. From 1911 to 1921, 14.1 per cent died. His permanent cures vary between 38 and 41 per cent according to the grouping, but according to Winter, the permanent cures are distinctly less.

Besides the subjects specially mentioned by me, the book is replete with information and will repay careful reading by all of those interested in both the technical and scientific side of gynecology.

In contrast to the preceding very personal volume, Crossen,⁴ as heretofore, offers encyclopedic reference to all gynecologic operative work with especial attention to technical details. The present edition has ninety new illustrations, making the number of illustrations eight hundred eighty-seven. A tremendous amount of material is handled in a strictly impersonal fashion except where, as an introduction to each type of procedure, the indications for selecting a given technic are presented. Practically every operation is referred to except those which have become superannuated. The sole exception to this is the Stoekel-Goebel operation for incontinence and Bumm's colli-fixation as well as promontory fixation, neither of which technics are much used in this country. Crossen's book continues to be an exhaustless mine of information, which is of equal value to the beginner and to the well-trained

⁴Operative Gynecology. By Harry Sturgeon Crossen, M.D., F.A.C.S. Third Edition. The C. V. Mosby Co., St. Louis, 1925.

and finished gynecologist who desires to refresh his memory on some operation which he rarely practices, or desires help in selecting the proper procedure.

It would seem to me advisable either to give a comprehensive review of the literature or, if this does not seem feasible, to omit all literary references. The authors quoted appear to have been selected at random and therefore an injustice is done to those whose work has not been acknowledged. This applies especially to such subjects as operations for retrodisplacement and prolapse of the uterus. In describing the operation for repair of the pelvic floor, Crossen again and again refers to the "musculo-fibrous sling." This together with his illustrations leave me in doubt as to whether he is describing levator suture, or simply favors the approximation of the fasciae which cover the levator and the deep transverse perineus muscle. The description of vesicovaginal fistula, it seems to me, could be simplified as well as clarified by dividing the technics into, for instance, (1) the denudation of the edges according to Sims, (2) mobilization by flap splitting, (3) mobilization by abdominovaginal procedures including hysterectomy, and (4) substitution, as for example the interposition operation.

Crossen's book doubtless will continue to enjoy its well-deserved popularity among the profession.

Döderlein and Krönig's *Operative Gynecology*⁵ does not in any way fall behind its well-known predecessors. Döderlein, the survivor, is the sole editor. He has been assisted in the chapter on anesthesia by Dr. Erwin Zweifel and in an important final chapter, dealing with the medico-legal aspect of both operative intervention and nonintervention, written by Professor Ernst Beling. Unfortunately this last chapter is limited to the German code. Few changes on the whole, in either text or illustrations, mark this fifth edition. Of the newly devised operation, Bumm's colli-fixation, Schubert's formation of a vagina by means of the lower rectum, Stoeckel's pyramidalis transplantation for incontinence, are the best examples. Functional uterine hemorrhages are now entirely relegated to the radiotherapist, a striking commentary of the open-mindedness of Döderlein, the surgeon. The author has obtained as good results from radiation of carcinoma of the cervix as from operation. His statistics, which extend over a period of five years, show that there is no operative mortality and that a number of cases which, from their extent, must be considered inoperable, can be saved by the x-ray. No new or illuminating statistics from the German clinics have been incorporated in the new edition. This book is of such sterling worth that whenever in doubt the gynecologist may turn to its pages for illuminating advice as to technical measures as well as for new points of view in nonoperative interventions. Only in one chapter of gynecology has Döderlein drifted behind the times and that is in the treatment of relaxation of the anterior and posterior vaginal walls. The operation for cystocele is archaic. The rectocele operation still considers the almost discarded technic of levator suture instead of approximation of the fasciae covering this muscle.

Another series of installments of Halban and Seitz's⁶ encyclopedic work has appeared. Installments 13, 14, 15, 16 and 17 contain parts of volumes v, vi, and vii.

⁵*Operative Gynäkologie.* By Döderlein-Krönig. Fifth Edition. Verlag von Georg Thieme, Leipzig, 1925.

⁶*Biologie und Pathologie des Weibes.* Von Prof. Dr. Josef Halban, and Prof. Dr. Ludwig Seitz. Urban & Schwarzenberg, Berlin, 1925.

13. Nürnberger describes echinococcus, actinomycosis and bilharziosis.

To Weibel has been assigned the subject of tuberculosis of the genitals. Some beautiful colored plates illustrate this chapter. The author describes both operative and expectant treatment but stresses especially roentgenotherapy, using 20 to 30 per cent of H.E.D. every four to eight weeks through large fields.

The subject of gonorrhea is taken up by Wagner. He does not begin treatment of a fresh infection until two or three weeks have elapsed.

14. Placentation is discussed by Grosser. He places follicle rupture in the human species at about the tenth day after menstruation. Dietrich takes up the anatomy and physiology of the fetus, as well as the biology of the placenta.

15. In this number the relation of the various organ systems to the female genital tract are discussed—eye disease (J. Novak), circulatory apparatus (v. Jagié), hematopoietic organs and blood (Hickl), liver and kidney (Eckelt) and finally the value of the blood sedimentation test (Linzenmeier).

16. Normal labor is dealt with by Sellheim, whose illuminating explanations of the mechanism of labor are well known.

Engelhorn has a short chapter on multiple pregnancy and labor.

17. The last installment to be considered contains four topics.

Matzenauer takes up syphilis, soft chancre, and skin lesions of the vulva. Twelve colored plates illustrate his text. There are no references to the literature.

Martin's short but well-written chapter describes the pelvic connective tissues and their diseases.

Freund covers the diseases of the abdominal wall, ligaments, blood vessels, and nerves of the female genital apparatus.

Sternberg describes ovarian tumors.

A critique of this monumental work will be attempted when all the material is at hand. In size and scope it already has left all its predecessors far behind.

A number of monographs dealing with special phases of gynecology deserve comment.

Cumberbatch and Robinson⁷ have given us a small book dealing with the *Treatment of Gonococcal Infection by Diathermy*. They give a full description of the technic, the proper method of selecting cases in both male and female, and a certain number of case histories as illustrations. Their best results have been obtained in infections of the urethra and cervix of the female, and in prostate cases in the male, especially in cases which had resisted all other forms of treatment. They also obtain relief in gonococcal arthritis. The authors do not believe that the effect is due solely to a thermal death of the cocci although heat of approximately 115 degrees Fahrenheit can be reached in the urethra and 120 degrees in the cervix. This therapeutic measure, which is still *sub judice*, may prove of value in selected cases.

Fulkerson,⁸ in small compass, details the technic of endoscopy and cystoscopy in the female. Chapters on renal function tests, diathermy, and acidosis are of special interest. Most of the illustrations (some from well-known textbooks) are excellent. A few of the line drawings, such as Figs. 121, 123, and 124 are crude.

⁷*Treatment of Gonococcal Infection by Diathermy*. By Dr. E. P. Cumberbatch, and Dr. C. A. Robinson. C. V. Mosby Company, St. Louis, 1925.

⁸*Gynecologic Urology*. By Lynn Lyle Fulkerson, M.D. P. Blakiston's Son & Co., Philadelphia, 1925.

The second volume of Paramore's *Statics of the Female Pelvic Viscera*⁹ is really an historical review of the treatment for prolapse of the uterus. In Part I the inception of plastic procedures is discussed, including the treatment by pessary from the year 1743 on, through the groping attempts of Hall, Jobert, and Baker Brown. Part II deals with the modern efforts at cure, beginning approximately around 1860 and sponsored by Huguier, Kückler, Tait, and Emmet. Part III deals with the more modern vaginal operations which include the work of Sims, Emmet, Hart, Hegar, and Le Fort. The fourth and last part takes up the conception of prolapse as a hernia and brings us down to the end of the last century. To those interested in historical medicine, this review, although not too exhaustive, should prove of value.

Liepman,¹⁰ who has shown an increasing interest and insight in the field of psychology as applied to gynecology, has written a new brochure entitled *Gynecological Psychotherapy*. It appears to me that he has erred in attempting to include the entire subject of psychology in this small monograph and hence has but a bare fourteen pages to devote to therapeutic measures.

Liepmann's method of searching for a phylogenetic structure upon which to base the workings of the mind is laudable; his attempt at phylogenetic synthesis is praiseworthy; his law of "threefold basis" (dreifachen Grunde) is, without his realizing it, purely and primitively symbolistic. To say that "to the uninjurable male one contrasts the vulnerable female plasma," to base the vulnerability of the female upon the penetration of the spermatozoan into the ovum (mainly a chemical union), upon the tearing of the hymen at defloration, and upon the monthly rupture of the ovarian follicle, is pure phantasy! His review and application of psychology is intelligent, stimulating, and beautifully expressed. His characterization of cubism—the schizoide art—is delightful. The adult and formed mind will derive profit from perusal of this book. To the student and adolescent medical learner the monograph presents many pitfalls because it glosses over what is least understood and hence presents, as completed, a discipline which is as yet in embryo.

Kretschmer's booklet¹¹ on hysteria, which appeared in 1923, is based on the thesis that hysteria is an abnormal reaction to the traumata of existence, usually with a distinct ulterior aim, such as war-hysteria or pension-hysteria. The various hysterical phenomena are analyzed in a simple and understandable fashion.

Another book of Kretschmer's,¹² of which the second edition was published in 1922, deals with *Psychology for Medical Men*. The soul, impulses and temperament, personality and reaction are described. This little book is of interest and value to the physician.

A number of new editions of well-known textbooks require but briefest mention.

Hirst's *Gynecology*,¹³ in its second edition, attempts, with some suc-

⁹The Statics of the Female Pelvic Viscera. Dr. R. H. Paramore. Volume II. H. K. Lewis & Co. Ltd., London, 1925.

¹⁰Gynaekologische Psychotherapie. Von Dr. Med. Wilhelm Liepmann. Urban & Schwarzenberg, Berlin, No. 24. 1924.

¹¹Ueber Hysterie. Von Dr. Ernst Kretschmer. Verlag von Georg Thieme, Leipzig, 1923.

¹²Medizinische Psychologie. Ein Leitfadens für Studium und Praxis. Von Dr. Ernst Kretschmer. Second Edition. Verlag von Georg Thieme Leipzig, 1922.

¹³A Manual of Gynecology. By Dr. John Cooke Hirst. Second Edition, Revised. W. B. Saunders Company, Philadelphia, 1925.

cess, to incorporate within its small compass the very newest acquirements. Of its kind, the book is good, clear, and sound. The grouping of Sampson's implantation cysts as derived from the oophoron, and serous, and pseudomucin cysts from the paroophoron, appears bizarre. The chapter on endocrines is far from sound or critical.

The third edition of the late Professor Boursier's *Textbook of Gynecology*,¹⁴ of which the second edition appeared in 1918 in Testut's new library for students of medicine, has been brought up-to-date by Auvray. This somewhat bulky, though small, two volume edition is strictly practical and elementary. The description of the physiology of the menstrual cycle leaves much to be desired and therefore the treatment of functional diseases is likewise not up-to-date. Otherwise the book is satisfactory, the surgery being especially well described.

Jellett's *Practice of Gynecology*¹⁵ has reached a fifth edition. This new edition has taken up the subjects of the Rubin insufflation test, ovarian transplantation, Sampson's adenoma of endometrial origin, sterility, and the Manchester operation for uterine prolapse (Donald's anterior colporrhaphy with excision of the anterior vaginal fornix). The book has a very excellent description of operative methods. The new edition has brought this volume fully up-to-date.

The second edition of Runge's *Gynecology for the Practicing Physician*¹⁶ is approximately the same as that of the first, which appeared only a year ago. The book is written in the form of case histories, the discussions being most illuminating.

OBSTETRICS

The second and third volumes of Döderlein's *Handbuch der Geburtshilfe*,¹⁷ together with the supplement, have now been issued. The three volumes form over 3200 pages of text, with more than 675 illustrations. We must consider this "handbuch" as a worthy substitute and continuation of the classical one edited by Von Winckel. The best talent in German speaking countries has taken part in this second edition. The first volume has been previously commented upon.

Volume II treats of the pathology of pregnancy, the first part was written by Otto Küstner, the second, by Ludwig Seitz. The late J. Veit contributed the chapter on extrauterine pregnancy, brought up-to-date by Weber. The pathology on labor has been written by Zweifel and Baisch.

Volume III contains the subject of puerperal fever (Zweifel), the operative treatment of this disease (Weber), puerperal bleeding (Siegel), inversion of the uterus and sudden death during the puerperium (both by Zangemeister). Weber discusses inflammation of the breast; Ibrahim, diseases of the newborn; Stoeckel, the urinary organs during pregnancy, labor, and the puerperium. The nervous and psychical disturbances of labor, pregnancy, and the puerperium are taken up by Siemerling, and a most important subject, that of the legal aspect of obstetrics, has been assigned to Kockel. This volume also contains a complete index, including an authors' index.

¹⁴*Précis de Gynécologie*. Par André Boursier. Volumes I et II, Third Edition. Paris. Gaston Doin, Editeur, 1925.

¹⁵*A Practice of Gynecology*. By Dr. Henry Jellett. Fifth Edition. Lea & Febiger, Philadelphia, 1925.

¹⁶*Die Gynäkologie des Praktischen Arztes*. Von Dr. Ernst Runge. Second, Revised Edition. Urban & Schwarzenberg, Berlin, 1925.

¹⁷*Handbuch der Geburtshilfe*. By A. Döderlein. Second Edition. Verlag von J. F. Bergmann, München, 1925.

The supplemental volume is devoted to operative obstetrics. All in all the "handbuch" is fully on the level with Von Winckel's valuable textbook and should be found on the shelves of every obstetrician. The work is too tremendous in size and scope to permit of a detailed review.

American readers of today must realize that continental authors either cannot or will not keep up with American (thereby including both North and South American) literature; that the readers of foreign textbooks will therefore only be kept abreast with the European literature, and that they must seek American sources in order to keep posted on our own advances. This fact will increasingly mitigate the reading and purchasing of foreign books by Americans.

A number of interesting monographs, which well repay careful perusal are now to be discussed.

Warnekros¹⁸ has published an atlas of x-ray pictures illustrating labor, including the third stage. Thirty-one excellent reproductions of the x-ray plates accompany the text. By overloading a soft tube, a mixture of hard and soft rays is obtained which bring out the fetal bones with great definiteness, the exposure lasting only from two to three seconds. These plates will be of particular interest to the teacher of obstetrics. To me, the most striking feature consisted in noticing the comfortable position assumed by the fetus *in utero*.

Scemla's monograph¹⁹ deals with the respective merits of symphyseotomy and cesarean section, with "temporary exteriorization" of the uterus in the presence of infection. This operation consists of bringing part of the uterus outside of the abdominal wall and shutting off the peritoneal cavity behind it; then emptying the uterus and leaving it outside of the abdomen for a variable period of days until involution has taken place. Whereupon the site of the uterine hernia is débrided and the resutured uterus allowed to slip back into the pelvis, the abdominal wound being closed without drainage.

Two German pamphlets dealing with the same subject, namely, the increase of induced abortion in Germany, portray approximately the same point of view. Vollmann,²⁰ like all observers in this field, emphasizes the tremendous increase in induced abortions since 1890, which, roughly speaking, appears to have increased from fifteen to thirty-eight per one hundred. He advises that the state offer inducements for having children by relief from taxation, special monetary help, and greater ease in obtaining habitations, which appear to be at a discount in the larger cities of Germany.

Weinzierl²¹ takes up particularly the unmarried mother. He made a study of five hundred such cases and emphasizes the fact that thirty of this number made serious attempts at suicide because of their despair. He considers that elevation of the mental and moral plane, social aid agencies and particularly the promulgation of new laws would provide remedies. He favors such laws as Denmark has inaugurated, which place the care of generative activities of woman under the eyes of the state. How successful such measures would turn out to

¹⁸Geburt und Nachgeburtperiode im Roentgenbilde. By K. Warnekros. Verlag von J. F. Bergmann, München, 1925.

¹⁹Indications Respectives des Pelvotomies et de la Césarienne suivie D'Exteriorisation Temporaire de L'Uterus. Par le docteur Jules Scemla. Gaston Doin, Editeur, Paris, 1925.

²⁰Die Fruchtabtreibung als Volkskrankheit. Von San.—Rat Dr. Vollmann. Verlag von Georg Thieme, Leipzig, 1925.

²¹Die Uneheliche Mutterschaft. Von Dr. Egon Weinzierl. Urban & Schwarzenberg, Berlin, 1925.

be, appears hard to foretell; nor can I consider the apparent or real increase of induced abortions as necessarily indicating decadence such as both of the authors believe it to show. More likely the greater care in studying such conditions accounts for much of this apparent increase. This, let us hope, together with the temporary postwar changes in the social structure, as well as the economic distress engendered by the conflict appears to be largely causative.

Frey²² has written a very important little monograph on *Heart and Pregnancy*. The material on which this work is based is that of Stoeckel, of Kiel, who placed at the author's disposal one thousand cases, of which, of course, only a minimum number suffered from heart trouble. Frey suggests that both gynecologists and internists, heretofore, have been too lenient in advising interruption of pregnancy. He demands that signs of decompensation, such as cyanosis and dyspnea, as well as signs of recent acute inflammatory endocarditis (such as tachycardia, secondary anemia, elevations of temperature) to be present before intervention is practiced. He emphasizes that in his opinion mitral stenosis should not be considered from a different point of view than other heart lesions. This little monograph well repays study.

The following new editions of textbooks on obstetrics have been received.

The third edition of Bourne's *Synopsis*²³ has added gynecology to the original obstetrical text. It is brief, in small print, and contains many facts as well presented as this unfavorable mode of writing will permit. The purpose is to supplement the larger textbooks.

The sixth edition of Eden's well-known *Textbook of Obstetrics*²⁴ has been revised by Eardley Holland. The revision has been judiciously performed so as not to alter the smoothness of the text. This edition, like previous ones, is fully abreast of its time. I take issue with the authors that a "fertilized ovum may be successfully implanted upon a quiescent endometrium" (page 6). Unless all of our comparative studies are at fault, the sole purpose of the premenstrual uterine change is to supply a proper nidus for the ovum.

Part two of the third edition of Fabre's²⁵ *Manual of Obstetrics* appears in a Spanish translation (published 1923), but otherwise unchanged.

Of more recent date (1925) is the second edition of Jeannin's *Obstetric Therapy*²⁶ which appears in the same Spanish series *Biblioteca de Terapéutica*.

ENDOCRINOLOGY AND ALLIED SUBJECTS

The second volume of Aschner's *The Constitution of Woman*²⁷ deals with the special application, while the first volume, previously discussed in one of my reviews, dealt with the general bearings of this subject. All credit must be given to the author for an extremely careful and

²²*Herz und Schwangerschaft*. Von Prof. Dr. Walter Frey. Verlag von Georg Thieme, Leipzig, 1923.

²³*Synopsis of Midwifery and Gynaecology*. By Aleck W. Bourne. Third Edition. William Wood and Company, New York, 1923.

²⁴*A Textbook of Obstetrics*. By Dr. Thomas Watts Eden, and Dr. Eardley Holland. Sixth Edition. The Macmillan Company, New York, 1923.

²⁵*Manual de Obstetricia*. Por el Prof. Fabre. Tomo II; Parto Patológico. Third Edition. Casa Editorial P. Salvat, Barcelona, 1923.

²⁶*Terapéutica Obstétrica*; Tomo xxvi. Por el Dr. Cirilo Jeannin. Second Edition, Salvat Editores, S. A. Barcelona, 1925.

²⁷*Die Konstitution der Frau*. Von Dr. Bernhard Aschner. Second Volume. Spezielle Konstitutionslehre. Verlag von J. F. Bergmann, München, 1924.

detailed consideration of his field. The great weakness in his exposition lies in the fact that he is unwilling to acknowledge, or unable to appreciate the fact that our knowledge is most incomplete. His discussion of habits, dyscrasia, plethora, rheumatic diathesis and similar vague concepts are insisted upon *ad nauseam*, and the real value of the book is obscured to the critical reader by the feeling that words frequently hide ignorance. On the other hand, no one can read the book without realizing fully that success in diagnosis and therapy depends upon full appreciation of the patient as a being. Thus, many medical men will be saved from concentrating too completely upon any one organ complex.

Aschner's method of dividing his subject is most interesting and stimulating. Under constitution and sex-phases he places puberty, menstruation and climacteric. Under these main headings every conceivable deviation from the normal is considered. Next he takes up separately, the constitution of various parts of the female sex organs, such as uterus, tube, ovary, vulva and vagina, the connective tissues, breasts, and even leucorrhea. An entire division of the volume is devoted to the effects of the general make-up upon pregnancy and puerperium. Twinning, abortion, and malformation of the fetus are discussed; and also the subject of determination of sex. Of interest is the form of the pelvis regarded from this point of view of development, and, finally, for a German book, an unusually complete bibliography, is appended.

Aschner is evidently a confirmed believer in humoral pathology. He takes for granted, (upon insufficient evidence, in my opinion) that the menstrual flow acts as a detoxicating excretion, and, in consequence of this belief, practices venesection to an almost unbelievable degree. An immense amount of material is most attractively presented but because of too evident marshalling of evidence to help out the author's thesis, little, if any, credence can be given to his conclusion. The author in other words, in his desire to present a subject of which we know only the elements, in a form of completeness, fails to be convincing. I, therefore, feel obliged to warn the casual reader against accepting Aschner's conclusions in their entirety or in following his therapy blindly. On the other hand, he will derive much profit by visualizing the symptom complexes which the author depicts most graphically.

Swale Vincent's *Internal Secretions*, third edition,²⁸ is, like the two former editions, interesting reading for the investigator, but the material is too unequally distributed to be recommended to the student. For example, the entire book contains 462 pages of which 150 pages are devoted to the adrenal gland and 39 to the male and female reproductive system. A nonendocrine explanation of sex, as advanced by Crew, is quoted at length, but recent work on the isolation of the female sex hormone, which makes Crew's hypothesis untenable, is not mentioned. On the other hand, the recent work of Carlson and his collaborators on the nonspecificity of "secretine" is fully discussed. Vincent's book has always appealed to me as a valuable bridge between purely theoretical and clinical endocrine writings.

Voronoff,²⁹ director of the experimental laboratories of the College of France, publishes a further endorsement of his testicular transplants for abolishing old age.

²⁸*Internal Secretion and the Ductless Glands.* By Dr. Swale Vincent. Third Edition. Physicians and Surgeons Book Company, 1925.

²⁹*Etude sur la Vieillesse et le Rajeunissement par la Greffe.* Par Dr. Serge Voronoff. Gaston Doin, Editeur, Paris, 1926.

His main thesis is that unicellular organisms are immortal. Physiologic death is unknown as death in the senium results from intercurrent infection. The main sign of senility is the replacement by the less differentiated connective tissue of epithelium, until proper function is interfered with. To combat this overgrowth is to abolish old age.

To date, Voronoff has transplanted the testes of forty-three monkeys (chimpanzee, cynocephalus, macacus) into man with uniform success. The transplantation of the ovaries of female monkeys into women is also highly successful. Why do the reports of this highly gifted investigator always give the impression of unsoundness? Is it because of the flashy type of presentation or because of a latent, innate prejudice that we harbor against the unusual, unnatural, and bizarre?

Jackson's *The Effects of Inanition and Malnutrition upon Growth and Structure*³⁰ is a most interesting and valuable collection of all the available data covering this subject. The author, being one of the most prominent workers in this field, has been able to sift and collate the material in such a fashion that it gives an exact picture of our present degree of knowledge. He defines inanition in a broad sense as indicating the lack of food or of any food stuffs (including water) which is essential to living organism. He pursues the subject through plants and invertebrates and especially elaborates its application to the vertebrate types. The second part deals with the effect of inanition, both total and partial, upon the body as a whole as well as upon every system and important organ taken separately.

Jackson agrees with the modern obstetrician that reduction of weight of the human embryo by starving the mother, is an impracticable procedure and that inanition effects the sex ratio in mammals in an as yet unanalyzable fashion. The various types of partial inanition produce the various insufficiency diseases. The osseous and nervous systems are most resistant, while adipose and lymphoid tissues disappear most rapidly. Mass experiments of the effects of famine, as studied during the Great War, would indicate that amenorrhea, and sterility, both temporary and permanent, can be directly ascribed to inanition, and in his conclusion, the author indicates his belief that the germ plasma may be so modified that there is a possibility of influencing heredity and evolution.

This book is an important contribution to both biology and medicine.

Kolmer's textbook on *Infection, Immunity and Biologic Therapy*, third edition,³¹ is a reference handbook covering the subjects discussed in a very satisfactory way. It contains an immense amount of material with ample references to the literature. This book aims to appeal to the practitioner and student as well as to the laboratory worker and, therefore, has to treat of both elementary and less well-established facts. Chemotherapy is not dealt with because the author expects to publish a monograph devoted especially to this subject. The immense amount of material hardly lends itself to a detailed review. Veterinarians will find much of interest to them included in this volume, because, as this specialty constantly requires the use of laboratory animals, immunologic, diagnostic reactions and specific therapy applicable to the animals are often discussed. The book is too detailed for the beginner who desires a quick means of covering the entire subject, but should prove

³⁰*The Effects of Inanition and Malnutrition upon Growth and Structure.* By Dr. C. M. Jackson. P. Blakiston's Son & Co., Philadelphia, 1925.

³¹*Infection, Immunity, and Biologic Therapy.* By Dr. John A. Kolmer. Third Edition. W. B. Saunders Co., Philadelphia and London, 1924.

indispensable to the physician and laboratory worker who care to keep abreast of the times or who desire to do laboratory work of their own.

MISCELLANY

Volume one of a new collection of monographs dealing with radiology has just appeared.³² The format, typography, splendid illustrations, and elaborate index reflect praise upon the editors (Holfelder, Holthusen, Jüngling, and Martius). The object is to assemble the widely scattered literature dealing with physics, biology, microscopic anatomy, and practical application of radiant energy.

Fischer, of Frankfurt, discusses aims and results obtained in the röntgen diagnosis of malignant and inflammatory tumors of the large intestine. Friedl and Schinz, of Zürich, take up the question of bone atrophy. A most important contribution is that of Lorey, of Hamburg, on the x-ray picture of acute miliary tuberculosis. Of more theoretical interest is Grebe, of Bonn, on the spectroscopy in medical röntgenology, as well as that of Küstner of Göttingen, on the measurement by ionization of Röntgen rays. Glocker, of Stuttgart, takes up the vital problem of filtration and arrangement of portals of entry. Physical sensitization is treated by Holthusen, of Hamburg. The Röntgen-testis is discussed by Schinz and Slotopolsky, of Zürich. Lahm, of Dresden, has been given the chapter on the raying of carcinoma of the cervix uteri, while Kurtzahn, of Königsberg, deals with esophageal carcinoma.

A more detailed discussion of this very important treatise will be taken up after the appearance of other volumes when a full scope of this big undertaking can be judged.

Evans is to be thanked for having translated de Martel and Antione's book on *Pseudoappendicitis*.³³ The name, though striking, is not strictly correct as the subjects dealt with include mainly a cecocolic syndrome. The basic cause of the trouble appears to be a mechanical obstruction, often at the hepatic flexure, producing cecal stasis, dilatation, and functional cecocolic stenosis. Gregory Connell, who has written an introduction for the English translation, says that "If the numerous operators of this country could be induced to read and study this small but important book, much would be accomplished toward transforming them into surgeons, and would bring about a realization of the fact that chronic appendicitis and pain in the right side, either with or without gastrointestinal symptoms, are not synonymous; that instead of being the simplest abdominal surgical condition, it is one of the most complex, and is, therefore, worthy of study, serious study, *before* and not *after* the removal of the so-called chronic appendix."

I am unable to agree with all the evils ascribed by the authors to this syndrome, but I am willing to concede that a thorough study of this book will save many patients from unnecessary operation for "appendicitis," and will throw light upon many obscure complaints. The technical methods of these French surgeons will not appeal to most American operators. A large T-shaped incision, spinal anesthesia, Villar's button with seroserous ligature instead of suture, are the main features of their methods.

³²*Ergebnisse der Medizinischen Strahlenforschung.* (Röntgendiagnostik, Röntgen-, Radium-und Lichttherapie) Herausgegeben von H. Holfelder, A.M.; H. Holthusen, Hamburg; O. Jüngling, Tübingen; H. Martius, Bonn a. Rh. Volume I. Verlag von Georg Thieme, Leipzig, 1925.

³³*Pseudoappendicitis.* By Dr. James A. Evans. F. A. Davis Company, Philadelphia, 1925.

Bodkin's second edition of *Diseases of the Rectum and Pelvic Colon*³⁴ supplies a short readable treatise on this subject. The book gives to the general practitioner an excellent survey of the subject but is hardly detailed enough to make any appeal to the specialist in this line. The author, on the whole, maintains a conservative and fadless attitude.

Theilhaber's³⁵ seventieth birthday and fiftieth anniversary of medical practice has been commemorated by a Festschrift to which well-known men such as Opitz, v. Jaschke, and Fichera, to mention a few, have contributed. Theilhaber has always stood out as an independent thinker, ahead of his time. He announced that mobile retroflexion produced no symptoms, that dysmenorrhea might be spastic, that myoma uteri was due to chronic hyperemia and carcinoma cervicis to local anemia. Nearly one hundred and fifty articles have been published by him. Eighteen articles covering diverse gynecologic and oncologic subjects contained in the Festschrift.

Barker's book on *Cancer*³⁶ is a most extraordinary compound of erudition, statistics, ignorance, credulity, and nonsense. The most extraordinary part of the book is that Sir Arbuthnot Lane has lent himself to write the introduction.

The author "has rushed the book out with utmost speed, believing that every delay will cause the unnecessary loss of many lives." His sermon is directed principally to the general public. Cancer is due to chronic poisoning and to vitamin starvation. Barker recounts his own experience; how he was saved from "advanced precancerous condition!" A quite extraordinary volume!

Levinson's *Pediatric Nursing*³⁷ was written for the instruction of the pupil nurse. It covers the subject adequately. Part III, dealing with the psychologic and sociologic factors, is specially to be commended.

The *Mother's Manual*, by Dorothy Bocker,³⁸ contains much of interest for mothers, public health nurses, and others, but also so many details, far above the average lay person's knowledge, that it may prove confusing reading.

McLean and Fales³⁹ offer a short, well-written textbook dealing with the scientific nutrition of infancy and early childhood, which is designed to cover the need especially of the student and general practitioner, as well as of the lay nutritional worker and nurse, but by no means to be spurned by the specialist, because of the good methodical exposition. I would recommend especially the chapter on the treatment of the nervous child. The book is designed particularly to point out the composition of foodstuffs, proper feeding, and the prevention, rather than the treatment, of nutritional disorders.

Hans Much, of Hamburg, in the series of *Modern Biology*, published by Kabitzsch, has written *Aphorisms*⁴⁰ which I confess are unintelligible to me, and which those interested will have to judge for themselves.

³⁴*Diseases of the Rectum and Pelvic Colon*. By Martin L. Bodkin, M.D. Second Edition. E. B. Treat & Company, New York, 1925.

³⁵*Beitrag zu den Problemen der Gynaekologie und des Karzinoms*. Festschrift für Hofrat Dr. A. Theilhaber. C. F. Pilger & Co., Medizin. Verlag, Berlin S. W. 48.

³⁶*Cancer. How It is Caused; How It can be Prevented*. By J. Ellis Barker. With an introduction by Sir W. Arbuthnot Lane. E. P. Dutton & Co., New York, 1924.

³⁷*Pediatric Nursing*. By Dr. Abraham Levinson. Lea & Febiger, Philadelphia and New York, 1925.

³⁸*Mother's Manual*. By Dr. Dorothy Bocker. Brentano's, New York, 1925.

³⁹*Scientific Nutrition in Infancy and Early Childhood*. By Stafford McLean, M.D., and Helen L. Fales, B.S. Lea & Febiger, Philadelphia and New York, 1925.

⁴⁰*Aphorismen zum Hellproblem*. Von Prof. Dr. Hans Much, Hamburg. Verlag von Curt Kabitzsch, Leipzig, 1925.

Whatever the author's aim may be, he misses the mark as far as I am concerned.

Volumes I and II of the 35th series of the *International Clinics* (March and June) have been received.⁴¹ As usual, a large amount of diverse material is dealt with. Lewellys F. Barker has returned to his early love, the neuron, at least for the moment, and gives us a delightful and instructive talk on psychoneurosis and the milder forms of psychoses. An unusual topic is that of Christopher who deals with the surgical diseases of Meckel's diverticulum. In Volume II, Erdmann deals with a topic of interest to all of us; namely, that of abdominal diagnosis. Krumbhaar enters into the very interesting, although difficult theme of the reticuloendothelial system, as well as some of the defense mechanisms of the body.

Copher and also White have written books dealing with aspects of surgical technic, although the titles are so much dissimilar. Copher's *Methods in Surgery*⁴² depict the technics of the Barnes Hospital, St. Louis City Hospital, and the Washington University Dispensary, and emphasizes in particular, history taking, pre- and postoperative care, diets, and all the various minutiae which play such an important rôle in determining whether an operation is to prove successful or not.

White⁴³ on the other hand, in his *Surgical Handicraft* stresses what we in the United States have called "minor surgery." Although this term might be considered to belittle the importance of the smaller interventions, this by no means holds true, because by proper care, and prophylaxis, the larger and more serious interferences may often be avoided. White's book also considers emergency measures which may arise.

Selected Abstracts

New Growths

Berard, L., and Dunet, Ch.: Cysts of the Bartholin Gland. *Presse médicale*, 1921, No. 104, p. 1029.

Unilateral single cysts of the Bartholin gland are the most frequent. Bilateral cysts are not at all rare and occasionally there are two cysts on the same side. They usually develop between the ages of twenty and forty years. The cysts may involve the glandular structure and consist of dilated acini or excretory ducts; there are also some proliferating cysts and others with a single layer of epithelium.

F. L. ADAIR.

Pauliucu-Burla: On the Pathology of Vaginal Cysts. *Wiener klinische Wochenschrift*, 1923, xxxvi, 639.

Such cysts may arise as the result of pinching off parts of the müllerian ducts during embryonal development, especially those found on the front and back

⁴¹*International Clinics*. Volumes I & II 35th Series. J. B. Lippincott Company, Philadelphia and London, 1925

⁴²*Methods in Surgery*. By Dr. Glover H. Copher. C. V. Mosby Company, St. Louis, 1925.

⁴³*A Textbook of Surgery Handicraft*. Dr. J. Renfrew White. Macmillan Company, New York, 1924.

walls of the vagina. These cysts are lined by one or two layers of cuboidal cells, though the vaginal epithelium of the fetus shows a change to a stratified type. The type of epithelium depends on whether the congenital fault occurs high up in the part of the müllerian duct that naturally carries cylindrical epithelium or low down in the region of solid strands of cuboidal cells.

The author had two cases which showed cylindrical epithelium lying on top of stratified epithelium. Some authorities believe that these cysts may arise from vaginal glands. Papillary outgrowths into the cavity of the cyst are found occasionally, and these favor the pinching off theory as regards etiology. The author reports two such cases. No ciliated epithelium was found in any of the author's fourteen cases.

Development from remains of Gartner's duct is the commonest etiology of vaginal cysts. Some cases show multiple cysts along a line running up the vagina. They are lined by cuboidal epithelium.

Cysts which have a lining of thin stratified epithelium may arise from attempts at gland formation on the part of the vaginal epithelium or from inclusions of islands of cells during the healing of birth lacerations.

Lymph vessels may give rise to cysts, their lining consisting of endothelial cells. One case of sarcoma developing in such a cyst has been described. Deep-lying nabothian cysts may resemble vaginal cysts. Vaginal cysts are usually benign.

The author reports two cases with no epithelial lining, it probably having been destroyed by birth trauma. Cysts may be ruptured during labor and may rarely become infected.

He describes three cases accompanied by vaginal septa and infantilism of the genital organs. Other coexisting congenital abnormalities have been described, such as bicornuate uterus, imperforate hymen, etc. FRANK A. PEMBERTON.

Bland-Sutton, John: *The Habits (Ecology) of Tumors*. *British Medical Journal*, November 10, 1923, p. 847.

The author endeavors to show that in their life history, tumors correspond with the parent organs, pass through a period of growth, attain maturity, exercise in some instances the same function as the parent organ, which leads to an increase in their bulk. They not only agree in structure with the tissues of the organs in which they arise, but they conform to the habits (ecology) of the parent organ. When present in the hollow viscera they may excite these organs to action. They may often initiate functional activity in an organ. He cites submucous fibroids as an example, and calls attention to the fact that these tumors may simulate pregnancy very closely. He also speaks of the erosive action of villi in relation to tumors.

Tumors of glandular organs are frequently endowed with functional activity. He cites various examples. In regard to ovarian dermoids he believes it is an established fact that these tumors differ from ova which have become actively independent of a normal stimulus. An ovarian fetus which we call an embryonal rudiment is produced in this way. He states that "in the common kind of ovarian embryoma the cutaneous elements are conspicuous; the products resulting from the activity of the skin preponderate and make up the bulk of the tumor mass. In mucigenous ovarian tumors the so-called 'colloid stuff' is furnished by the gastrointestinal epithelium of the embryoma"; in them the mucous membrane prevails. In this manner he supports his thesis: "Many tumors become manifest by the accumulation of the products of their own activity." F. L. ADAMS.

Werner, P.: The Development of Malignant Tumors of the Female Genitalia following Deep X-ray Therapy for Benign Conditions. Wiener klinische Wochenschrift, 1925, xxxviii, 403.

Since 1922 many authors, including Bumm, A. Beck, Prochownik and others, have reported cases which developed malignant tumors of the genitalia following deep x-ray therapy for benign pelvic conditions. There have been eight such cases observed at the Second Frauenklinik in Vienna, including five cases of carcinoma of the cervix, one of carcinoma of the body of the uterus, one of carcinoma of the cervix and the body, and one case of sarcoma of the ovary. Since there were 2680 cases treated in this clinic by deep x-ray therapy for benign pelvic conditions, the frequency of those developing malignant tumors is approximately 0.3 per cent. The normal rate of malignancy, however, in gynecologic conditions is 5 per cent and the author concludes, therefore, that deep x-ray therapy not only does not predispose towards the development of malignant tumors but is a definite prophylactic agent against such a development.

RALPH A. REIS.

Steinhardt, B.: Clinical and Statistical Study of Sarcoma of the Uterus. Wiener klinische Wochenschrift, 1924, xxxvii, 844.

The percentage of myomata that develop or "proliferate" into sarcomata cannot be determined unless all cases of the former would be subjected to operation and to microscopic examination. In order to arrive at some conclusion as to this percentage, the author examined a large mass of myoma material in the Second Frauenklinik in Vienna. She stresses the point that the formation of sarcomata from preexisting myomata is not a "degeneration" but rather a "proliferation," and considers the former term, therefore, a misnomer. During the years 1908 to 1923, there were 1363 cases of myomata of which 38, or 2.78 per cent, showed sarcomatous changes. The author compares these figures with those reported by Frankl from the First Frauenklinik, who reported 1876 cases with 46, or 2.5 per cent, showing sarcomatous changes, during this same period of time. If all cases of myomata, including those not operated upon, were included in this series, the incidence of sarcomata would be 1.84 per cent.

Of the 38 cases of sarcomata, 31 were of the uterus wall, 5 took their origin from the mucosa, and 2 were of doubtful origin. Sixty-seven per cent began from preexisting myomata. These secondary tumors may be recognized by the ring of unchanged myoma tissue surrounding the sarcoma. Submucous myomata are more prone to sarcomatous changes than are any other type. Histologically, all types of cells were found, the majority, however, being cells derived from undifferentiated muscle cells.

Sarcoma is more common during and after the menopause. In regard to pregnancy: 30 per cent had never been pregnant, and the author, therefore, does not consider frequent pregnancies an important etiologic factor.

There is no definite symptom complex on which to base a diagnosis and in none of the 38 cases was the diagnosis established before the operation. The submucous type is characterized by the friability of the tissues, by rapid growth following removal, by cachexia and by edema of the extremities. In no case was the diagnosis established by curettage.

The prognosis was poor. Of this series, 44 per cent of the cases followed, terminated fatally in from seven to fourteen months. Thirty-four cases were operated upon, and nine showed metastases in neighboring organs, including the ovaries, parametrium, rectum, retroperitoneal glands, and also in the suprarenals, liver, and lungs. The other four cases were considered inoperable. X-ray or radium treatment was given following operation. Twenty-seven per cent were cured. Over 50 per cent died within one year in spite of the fact that they were operated upon early.

RALPH A. REIS.

Dodd, W. E.: Sarcoma of the Fallopian Tube. *Surgery, Gynecology and Obstetrics*, 1924, xxxix, 302.

The author reviews the literature on primary sarcoma of the tube and finds but twelve authentic cases, to which he adds two new reports. The first instance is that of a single woman, age fifty-five years, who for six months had a constant watery discharge from the vagina which became blood stained two months previous to examination. She had no pain. Physical examination was negative with the exception of a vague resistance over the entire right side of the abdomen and slight suprapubic tenderness. At operation the right tube was found dilated and a soft cauliflower-like growth, the size of an olive, protruded from the fimbriated extremity. The right tube was excised with the tumor. The patient made a good recovery, did well, and gained weight for one year following operation, after which no further record of her was obtained. Microscopic examination showed the tumor to be a spindle-celled sarcoma.

His second case is that of a married woman, aged sixty, who had felt weak and in "ill health" for the past year. Eight days before admission to the hospital she began to have a bloody discharge from the vagina. The menopause took place eight years previously. Vaginal examination revealed a vague mass on either side of the uterus. At operation both tubes were found dark in color and distended. Tubes, ovaries, and appendix were removed. Microscopic examination revealed a spindle-celled sarcoma in the wall. Two years later the patient died. At autopsy the lungs were found studded with tumor nodules. A large mass in the abdomen was a tumor which had been diffusely scattered throughout the abdominal cavity. Microscopic examination showed that these tumors were of a character similar to that of the primary growth.

In a total of 1871 salpingectomies, most of them bilateral, all specimens have been studied both grossly and microscopically, and these are the only two instances of sarcoma among them.

WM. C. HENSKE.

Petersen: Mixed Tumors of the Uterus. *Journal of Laboratory and Clinical Medicine*, 1923, viii, 369.

Mixed tumors of the uterus are classed among the malignant growths, although metastases occur late, as a rule. They are composed of mesoblastic tissue, such as smooth and striated muscle fibers, fibrous tissue, fat, bone, cartilage, endothelial tissue, and certain undifferentiated mesoblastic tissues. Quite a number are composed mostly of fat and have therefore been reported as lipomata. Petersen points out that practically all of these, of which histologic studies have been made, were shown to contain other structures as well.

These tumors have been observed in patients from two to seventy-five years of age, 50 per cent having occurred in women over fifty. The prognosis is bad, not so much from the formation of metastases as from local recurrence.

Petersen reports two new cases. One patient died three months after operation and a year after the onset of symptoms, the other being alive and well two years after operation and six years after the onset of symptoms.

R. E. WOBUS.

Johnstone: Adenomyoma of the Uterus With Tuberculous Infection. *Journal of Obstetrics and Gynecology of the British Empire*, 1924, xxxi, 243.

Unlike the ordinary fibroid tumors, adenomyomata of the uterus, devoid of capsule and deriving their glandular elements from the highly vascular endometrium, are relatively free from the various forms of degeneration. Conversely one would expect to find infection through the blood stream relatively common in these tumors. That this is not true is shown by the author's inability to find,

after careful search of the literature, more than six cases of adenomyoma of the uterus secondarily infected with tuberculosis. Where tuberculosis exists in the uterus and ovaries without involvement of neighboring organs (peritoneum and tubes) the inoculation has occurred through the blood stream. Examination of this and the previously reported specimens showed the glandular portions most subject to involvement. In the present case, infection apparently originated in the lungs and spread later to the endometrium from whence the glandular prolongations into the adenomyoma provided ready access into the tumor.

H. W. SHUTTER.

Vogt, E.: *Theoretical and Practical Considerations Arising from the Study of Endometrial-Like Epithelial Growths in the Ovary.* Medizinische Klinik, 1924, xx, 884.

Sampson believes that the ovarian hematomata, which he calls tar or chocolate cysts, arise from islands of endometrium which come from the epithelium of the uterus or tubes. These ovarian cysts may rupture under the influence of menstruation and thereby produce implantations in the peritoneal cavity. The latter frequently resemble endometrium more closely than does the epithelium of the original ovarian hematoma. Menstrual blood which contains pieces of endometrium may reach the fallopian tubes when the passage of blood through the cervix is impeded by blood clots, tissue such as is passed in membranous dysmenorrhea, or because of retroflexion, myomata, polyps, etc.

The symptoms of these endometrial implantations are dependent upon their participation in menstruation, their tendency to produce adhesions in the abdominal cavity, and their invasion of the large intestine. The patients have dysmenorrhea or intestinal complications during menstruation. Palpation reveals a small cystic ovary and changes in the culdesac. Therapy is valuable and conservative treatment is not always successful.

From a prophylactic viewpoint the following considerations are important: In cases of cancer of the uterus, bimanual examination should be gently done. A diagnostic curettement should be done only in suspicious cases and with extreme care. If radium is used, the capsule should be inserted gently. In doing a hysterectomy the uterus should be grasped lightly and all communications between the uterus and the abdominal cavity, such as the fallopian tubes, the uterine and ovarian blood vessels, and the round ligaments, should be doubly ligated before the uterus is removed.

Some cases of tubal menstruation may be only cases where there has been a back-flow of menstrual blood from the uterus. Some cases of extra-uterine pregnancy where no evidence of inflammation or maldevelopment can be found may be explained on Sampson's theory. The occurrence of ovarian pregnancies may be more readily explained if we assume that the fertilized ovum can implant itself on an endometrial-like area which is capable of undergoing a decidual change.

No gynecologic examination should be made during the menstrual period because menstrual blood may be forced back into the tubes. If a retroverted uterus actually favors the back-flow of blood through the tubes, then we should treat retroversion either with a pessary or operation even when no symptoms are present. Obstructions to the cervix, such as laminaria tents, packing, and cervical pessaries, should be avoided. In doing the Rubin test it might happen that epithelium would be blown into the abdominal cavity, especially if the test is performed immediately after a menstrual period.

J. P. GREENHILL.

Von Oettingen, Kj., and Linden, H.: *Heterotopic Epithelial Proliferations of Uterine Mucosa in the Ovary and Their Relationship to Chocolate Cysts*. *Archiv fuer Gynaekologie*, 1924, cxxii, 718.

The authors found twenty cases of cystic ovaries which showed gland tissue resembling uterine mucosa. These cases showed two definite types of structure, —a deep and a superficial. The deep type showed typical areas of uterine mucosa which originated from the ovarian epithelium and dipped down deep into the ovarian stroma. They contained old blood as well as fresh blood and the authors show by their illustrations, definite and well-marked connections between these deposits and the surface epithelium of the ovary. They cannot, therefore, agree with Sampson that these formations result from retrograde deposits which have come from uterine mucosa by way of the fallopian tubes.

The second, or superficial type, resembles uterine mucosa during the intermenstrual period and is situated on the ovary rather than in the ovary. This type results from the rupture of chocolate cysts and not from deposits from the uterine mucosa because, according to the authors, the ostium of the fallopian tube is too small to permit the passage of such bits of tissue.

Women in whom such heterotopic epithelial proliferations are found, are constitutionally inferior. Practically all patients in whom Sampson found this condition had myoma in varying degrees and many suffered also from retrodisplacements of the uterus and adhesions. Sampson has definitely shown that during uterine congestion, blood from the uterine cavity may be expressed through the tubes. This blood irritates the serous epithelium, which is defective, and, under the influence of pathologic hormones, this serous epithelium proliferates into the deeper structures and forms tissue resembling uterine mucosa. As a result of subsequent menstruation, these cells develop into chocolate or tar cysts. Further development is brought about by the rupture of these cysts which leads to secondary implantations. Many chocolate cysts develop from corpus luteum or follicle hematoma, and not all, therefore, can be traced back to this secondary formation caused by irritation.

RALPH A. REIS.

Levy-Du Pan: *A Case of Hypernephroma of the Ovary*. *Schweizerische medizinische Wochenschrift*, 1924, liv, 1198.

The tumor in this location is an extremely rare one. Since 1878 only nine other cases outside of Weise's first report have been described in the literature. Pan's patient was a nullipara, age twenty-six, who came to the clinic complaining of prolapse of the uterus. It was impossible to restore the prolapse, and abdominal examination revealed a mass as large as a fetal head on the left side. She was later operated and a mass found adherent to intestine, tubes, and uterus. The mass was removed and a ventral fixation of the uterus effected. The pathologic diagnosis on the excised tissue was "hypernephroma of the ovary with rapid proliferation and degeneration—chronic salpingitis." The author discusses the various theories concerning the origin of this tumor and feels that it is due to an embryologic fault since the kidney, testicle, ovary, and adrenal capsule all are developed from closely contiguous structures. The prognosis is always grave because of the tendency to rapid metastasis. A. C. WILLIAMSON.

Stubler: *Heterotopic Epithelial Growths in the Genital Organs, Especially the Ovary*. *Deutsche medizinische Wochenschrift*, 1924, I, 908.

Stubler believes that if Sampson's endometrial hematomata of the ovary were caused by the back-flow through the tubes of menstrual blood with pieces of endometrium, which become implanted on the ovary, we should expect to find metastases on the pelvic peritoneum in cancer of the endometrium from a sim-

ilar process much more frequently than we do. Further, he believes that the metastases in the tubes in cancer are formed through the lymphatics. He says that it is not proved that this back-flow is more likely to occur in retroflexion, especially as a movable retroflexion is not a pathologic position of the uterus. The adherent retroflexion found in these cases is the result and not the cause of the process. He does not believe that the endometrium cast off during menstruation is viable and does not accept Jacobson's experiments because it is not reasonable to believe that endometrium can be transplanted if such sensitive tissue as that of the ovary cannot be transplanted with success.

He believes that these growths arise from the germinal epithelium of the ovary but he does not account for the blood, blood pigment, and typical endometrial glands which are so frequently seen.

F. A. PEMBERTON.

Kovacs, F.: Thyroid Tumor of the Ovary. *Archiv fuer Gynaekologie*, 1924, cxxii, 766.

The author reports a very rare form of ovarian tumor which he found in a woman, thirty-three years of age, who came to the clinic on account of a goiter and menorrhagia. She had had symptoms of exophthalmic goiter for several years, including protrusion of the eyeballs and nervousness. Bimanual examination showed a tumor the size of a goose egg in the left ovary. This was removed together with a myomatous uterus which also contained polyps. Macroscopically, the ovarian tumor resembled a colloid goiter especially on the cut surface. Microscopically, it proved to be tissue typical of a colloid goiter, with all the structures and staining qualities characteristic of such goiters. Upon examination of the patient nine months later, all the exophthalmic symptoms had disappeared although the goiter was unchanged. The tumor was, therefore, true thyroid tissue functionally as well as structurally and chemically.

The author discusses the etiology of such tumors and states that they may be due to goiter metastases but more probably are teratomatous growths in which the thyroid anlage alone was present or had overgrown the other structures. The distance from the thyroid gland rules out the theory of displaced thyroid tissue anlage.

RALPH A. REIS.

Daniel, C., and Babes, A.: A Study of Xanthoma of the Uterine Tube (Salpingitis Xanthomatosa). *Presse médicale*, Dec. 22, 1923, xxxi, p. 1073.

The authors describe in detail the gross and microscopic lesions in three cases, found identical in all respects with those of true xanthoma. This tumor is most common in the skin and in the articulation, and is occasionally found in other parts of the body, but, as far as could be ascertained, has never before been noticed in the fallopian tube. The tumor is usually no smaller than a pea, and is composed of large rounded or polygonal cells, infiltrated with crystals and drops of cholesterin, and contains lipoids. The origin of the cells has not been determined; in some cases, they appear to develop from endothelial cells, in others, from connective tissue cells. In addition to true tumor formation, we find xanthomatous deposits in inflammatory tissue, and at times in other tumors. There is an associated general or local cholesterinemia, and a local lymphatic stasis. The tumors may be single or multiple, often in chains; in the cases reported multiple small tumors were found, in two cases involving the mucosa, and in the third chiefly affecting the muscular wall of the tubes.

Xanthoma of the tube is to be distinguished from pseudo-xanthomatous coloring of the tube wall in salpingitis, from accessory suprarenals of the broad ligament, from caseous tubercular masses, and from lipomata and papillomata of the tube. It is possible that xanthoma of the tube may undergo malignant transformation and metastasize, as has been noted in xanthoma of the skin.

The authors conclude that the presence of this tumor in the tube is accounted for by the local lymphatic stasis subsequent to the primary inflammatory process, together with the local hypercholesterinemia consequent upon the lutein formation in the ovary, which contain large amounts of cholesterol. Thus the two conditions are fulfilled.

E. L. KING.

Spencer: Suppurating Teratomatous Cyst in the Splenic Region. *British Journal of Surgery*, 1921, ix, 72.

Partly in vivo and partly postmortem, Spencer removed a retroperitoneal teratoma from a woman of forty-nine years who had borne three living children. The mass was situated in the left hypochondrium, in contact with the left kidney and the tail of the pancreas. Examination of the cyst and its contents by J. A. Braxton Hicks revealed, among pus and debris, a mass of hair, fat, and sebaceous material, and a teratomatous mass. The latter contained bones resembling a pelvis, a femur, tibia and fibula and a pedunculated smaller mass also containing bone. Both masses were covered by skin. Hicks believes this mass to be due to misplaced mesoblastic tissue.

R. E. WOBUS.

Schmid, Hans Herman: Retroperitoneal and Mesenteric Tumors. *Archiv fuer Gynaekologie*, 1923, cxviii, 490.

Schmid reports three cases, the first of which was an immovable fibrosarcoma in a twenty year old girl, filling half the abdomen and growing out between the leaves of the mesentery; the small intestine and cecum were adherent to the growth, necessitating intestinal resection with ileocolostomy; there was no recurrence in six years. The second case was a spindle-celled sarcoma, the size of a child's head which separated the peritoneum from the ascending colon for which intestinal resection was done; there was no recurrence within a year and a half. The third case was also a spindle-celled sarcoma situated in the transverse mesocolon, in a woman fifty-five years of age. Schmid also reviews 267 reports of such tumors in literature. An analysis shows that the ages ranged from seven weeks to seventy-three years, 67 per cent occurring in women; the usual complications were rupture into the lumen of the intestinal canal, rupture into the abdominal cavity with severe hemorrhage, suppuration and torsion. He stresses the marked frequency of transition from benign growth to a malignant one. The majority of these growths recur even though, histologically, they are benign. The diagnosis is difficult, but operation should be done early. The operative mortality is still above 7.5 per cent.

RALPH A. REIS.

Becerro de Bengoa, R.: Gynecologic Surgery of Cysts Included in the Illopelvic Mesentery. *Revista Espanola de Obstetricia y Ginecologia*, 1921, vi, 147.

Cysts included in the mesentery of the pelvic colon are almost always treated by the gynecologist because they are generally diagnosed as ovarian or para-ovarian in origin. Such cysts may be juxtaparietal, situated midway between the parietes and the intestines, or juxtaintestinal. They give no characteristic symptomatology. The origin of such cysts is probably Wolffian.

Treatment should consist in extirpation. Marsupialization is an incomplete and unsatisfactory procedure. Cysts of the ascending portion of the mesentery should be approached through the left lamina of the latter; they are often difficult to remove owing to their close attachment to the gut. Those of the descending limb are not, as a rule, so closely adherent to the intestine, but often cause great difficulty from their attachment to the iliac vessels and the ureter. In a few cases where the cyst is situated low down a hysterectomy may be necessary in order to expose the field of operation satisfactorily.

THOS. R. GOETHALS.

Correspondence

TO THE EDITOR OF THE AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY:—

The establishment of the Joint Committee on Maternal Welfare has inspired the following remarks by one who is impressed by the magnitude of the task imposed upon this committee. It seems regrettable to me that the men doing obstetrics in this country have been so slow in realizing the necessity for some well-formed plan for carrying on a campaign to lower the fetal and maternal morbidity and mortality. I have often tried to get at the cause of this, located as I am at a distance from any teaching center and pioneering obstetrics as a specialty in this section.

I do not believe that the profession itself is altogether to blame for the deplorable mortality rate. The public at large has been slow in coming to the realization that reproduction is any more than a normal process, and that any more is necessary than to have somebody present to tie the cord, grease the baby, wrap it up, and if by that time the placenta does not come away, for some bystander to remove it by making traction on the cord. Since babies have been born ever since the dawn of time, people are slow to realize that special skill and knowledge born of close observation and training are oftentimes necessary for the happiest results. The average family would not permit the most skilled surgeon to remove an appendix in the home, nor would they argue about the fee for this removal; or if a child's tonsils were to be removed, would the parents hesitate to send the child to a hospital. Nor in either case would they object to paying from three to ten times as much for a comparatively simple operation of a few minutes' duration as they would to pay the physician who should have spent hours at the time of delivery of the mother, to say nothing of the numerous prenatal calls and postpartum attention that she should have had. We as physicians are, of course, somewhat to blame, inasmuch as we ourselves have been slow to recognize and teach the dignity of obstetrics as a profession. We have not put our own house in order, and so long as the surgeons have been allowed to dominate the hospitals and the public allowed to believe that nothing is too good for the surgical departments in the hospitals, that the obstetrical department is unimportant and can be housed in the least desirable quarters, so long will obstetrics continue in the state it is in today.

I so often hear men in general practice say there is nothing interesting in obstetrics, that there is such a sameness to it, that I am convinced that the average man doing obstetrics as a side-line has either become careless and lost his faculty of observation or else he never had proper training or was not taught to be on the lookout for any deviation from the normal. This belief is further confirmed by the too numerous cesarean sections done with insufficient indication, on cases brought to surgeons without obstetrical training or conscience, by men in general practice who are not able to recognize the existing condition and outline its proper management.

Furthermore, the leaders and teachers in the obstetrical field have been too slow in furnishing opportunities for postgraduate observation and teaching. I have spent weeks in several of the larger cities literally begging for an opportunity to observe the routines and advancements being made by the teachers, and it is only in the past few years that any adequate plans and provisions have been made for the man in general practice who has but a few weeks at his disposal to

brush up on this subject. Another deplorable state of affairs is the attitude that the average intern has toward obstetrics. In our city of 100,000 people we have two hospitals of over 100 beds and one of 225. We get interns from the central west medical schools. It is almost impossible to get an intern delegated to a strictly obstetrical service. He is allowed and even expected to look after medical cases of all kinds, scrub up and assist in the operating room with both clean and pus cases, dress clean and pus surgical cases, come into the maternity department, handle newborn babies, assist in the birth room, and children's ward. They do not seem to find time or have the inclination to watch a normal case through labor, delivery, and the puerperal state. It is a common occurrence for me to have a report from three or four different interns on a single woman in labor. How much good do they get from going into the room and seeing this woman once and perhaps not again during her stay in the hospital? This, of course, is the fault of the staff, for its members cannot be made to realize how obviously unfair it is to the intern that he is not given an opportunity and *required* to watch these cases through from beginning to end.

Medical students should be impressed, by the teachers of obstetrics during their student days, with the dignity of obstetrics, and of the important part it plays in the economic and maternal welfare of the community in which they are going to practice. They should be told repeatedly that after they have finished their internship and gone out into practice, obstetrics is going to furnish a large part of their living for a number of years—that they will practice a good many years before they will be allowed to amputate a leg or arm, operate on a hernia, or remove a single appendix. They should be further impressed by the staff and attending men of our hospitals that a large part of the time they spend in the operating room is wasted so far as their future income and practice is concerned, and that the time spent in the operating room should be when they have nothing else to do. The recent graduate has the same exalted opinion of the glare and glory of surgery and the operating room as the laity has, and does not realize that surgery will play a very small part in his practice and livelihood. I believe that much can be done for the future of obstetrics in this country by looking more closely after the training of these younger men. It is a very common occurrence to have them voluntarily speak of their insufficient training and experience, and many of them regret after it is too late that they missed any opportunity to make themselves more proficient in this phase of their professional career.

So far as I know, New York City is the only place offering many opportunities for short courses in postgraduate obstetrics. I have often thought how much good would come if the general hospitals scattered over the country would make provision for men in their locality to come and live in the hospital for a varying length of time—from one month upward and devote their entire time to obstetrical work. I know of many such hospitals having a considerable maternity service, with good attending men who would be glad to discuss obstetrical problems with these visiting physicians and help them in every way possible to get a better understanding of this part of their work. In this way many men would come to learn more about normal labors and the value of the test of labor in questionable cases, and to study the mechanism of labor undisturbed by oversolicitous friends of the patient. The excuse so often given for meddlesome interference and too early attempts at delivery of a normally progressing case is that the family insisted on something being done. This insistence would not be so strong or hard to combat by the attending physician if he were sufficiently sure of himself, so that he could instill in the patient and also her friends that he had the situation well in hand.

I do not believe that much can be done to improve the obstetrics done by men

beyond middle life or the men who are more interested in surgery and who try to interpret everything on a surgical basis and practice obstetrics as a side-line. These two classes of physicians are either too set in their ways or spend too little of their reading time on obstetrical subjects. The only way they can be reached is by a well-organized plan of getting a considerable number of papers every year before the county and state societies. I have often wondered at the intense interest shown in an obstetrical paper read before these societies, and the length of discussion of these papers is usually so great that they have to be cut off for lack of time.

I think it is a wonderful step in the right direction for the JOURNAL to institute a department of maternal welfare. This can be made an immense help to those of us so far out in the "sticks" and can be developed into a clearing house for many problems that we need discussed from time to time.

Nov. 11, 1925.

J. D. CLARK, M.D.

ORPHEUM BUILDING,
WICHITA, KANSAS.

Items

American Gynecological Society. The Fifty-first annual meeting will be held at Stockbridge, Mass., on May 20, 21 and 22, 1926. This will also be the semi-centennial of the founding of this, the oldest national organization of the members of this specialty in the United States.

Boston: To commemorate the seventy-fifth birthday of Dr. Charles M. Green, professor emeritus of obstetrics at Harvard University, over two hundred of his friends and colleagues attended a complimentary dinner at the Harvard Club on the evening of December 18th. The Toastmaster was Dr. Frederick C. Shattuck, the former professor of medicine at the Harvard Medical School, and among the invited guests were Drs. Joseph B. DeLee, Emilius C. Dudley, John M. T. Finney, Prof. Charles H. Grandgent, Drs. Barton C. Hirst, George W. Kosmak, Prof. Henry Pennypacker and Dr. John O. Polak.

At the close of the speaking a silver bowl was presented to Dr. Green and also a memorial volume containing an address and the signatures of those who participated in the dinner.

Chicago: Dr. Frederick P. Falls, of Iowa City, has been appointed professor of obstetrics and gynecology at the University of Illinois College of Medicine.

Cincinnati: The Board of Trustees of the University of Cincinnati have appointed Dr. Chas. L. Bonifield director of the Gynecologic Department to succeed the late Dr. Sigmar Stark, and Dr. Henry L. Woodward, acting director of the obstetric service. The Mendenhall Scholarship in obstetrics for the current year has been awarded to Dr. R. L. Crudgington, resident in the Cincinnati General Hospital.

Cleveland: Dr. William H. Humiston has been made emeritus professor in gynecology at the Western Reserve University after many years of service as a clinical teacher in this subject.

Philadelphia: Dr. Edmund B. Piper has succeeded to the vacancy on the obstetric and gynecologic staff of the Philadelphia General Hospital caused by the death of Dr. John Cooke Hirst.

Regional Consultants, New York State Department of Health: Dr. Geo. W. Kosmak and Frederick W. Rice, of New York City, have recently been appointed members of the staff of the Department of Maternal Welfare, as a part of the movement for lectures and clinics in the postgraduate work in obstetrics.

The American Journal of Obstetrics and Gynecology

VOL. XI

ST. LOUIS, FEBRUARY, 1926

No. 2

Original Communications

AMERICAN ASSOCIATION OF OBSTETRICIANS,
GYNECOLOGISTS, AND ABDOMINAL SURGEONS,
THIRTY-EIGHTH ANNUAL MEETING,
SEPTEMBER, 1925

THE PRESIDENT'S ADDRESS

BY ASA B. DAVIS, M.D., F.A.C.S., NEW YORK

A YEAR ago in my absence from our meeting in Cleveland, upon nomination by our valued and beloved Dr. Miller, you elected me as your presiding officer for the ensuing year. I conceive this to be the highest medical honor which has or will come to me. The intimate knowledge acquired in this office of the workings of the Association, its history and accomplishments, increases my respect and high esteem for it. My sense of responsibility, and sometimes my shortcomings, have grown and flourished. I find myself in the Hibernian situation "perfectly solvent in feeling but bankrupt in expression," when I attempt to thank you.

We have met here in one of the many beauty spots of our expansive country for our Thirty-eighth annual session. Fellows, guests, and friends, coming from widely distant points, and our kindred across the invisible border, as your spokesman it becomes my pleasurable duty to bid you a cordial welcome.

A program has been arranged, employing some of the evenings for scientific sessions, leaving part of the daytime for relaxation and pleasure, without losing sight of the primal object of this meeting.

In 1910 I read, by invitation, my first paper before any medical society at the annual meeting of this Association held in Syracuse, and was elected a Fellow the following year at Louisville. At the first

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

meeting I was very soon conscious of an atmosphere which was entirely new to me in medical societies. None of those present were well known to me; it is doubtful whether I had ever seen more than three of them, yet I was made at once to feel free and at ease. There was the appearance of a meeting of one large family with all of its members in harmonious accord. In the scientific sessions there was no evidence of weakness, papers were presented, and the subjects freely and frankly discussed without personality or sting. From my observation this characteristic has been maintained throughout succeeding years. It behooves us to believe that this is a priceless heritage and to take great care to see that it is nurtured and not lost. It is fair to state that there has been a vast improvement in this respect in medical meetings.

Individuals, organizations, and nations are endowed with a certain character. Circumstances, environment, and cultural development will do much, but the deep underlying character does not change. Reputation will carry one far, but unsubstantiated by character, sooner or later, there must come a time when its foundations begin to crumble. In taking note of the founders of this Association, their aims and accomplishments, their capacity and the years of service devoted to the advancement of the society's best interests, I think we find an explanation of its achievements and present status. One by one the founders and older members are being gathered to their rest, and the ranks filled and work shifted to other shoulders to carry on.

We note with satisfaction that the guard at our gates of admission has been reenforced, and that an attempt is being made to liquidate some of our frozen investment in the form of inactive members and to prune out the few indifferent, unproductive branches. This process should be conducted with temperance and great care, to the end that no good member shall be eliminated and no likely candidate, who measures up to our requirements, denied admission.

In this land of great and increasing medical activities, workers with records of achievement and promise should be readily found and gathered into our ranks in sufficient numbers to make good our losses and fill our membership list to its capacity. We should maintain our reputation as a working organization, endeavoring with all modesty to carry our standard so high that we cannot properly be the recipients of condescension from any source.

I take it that every Fellow of this Association is an important member of his own community, where by his ability and work he attracts responsibilities and obligations, in continuous procession, which he finds difficult to lay aside. Those who have prepared papers have done so, in many cases, under the midnight or early morning lamp, in time stolen from earned and needed rest. And yet, in goodly numbers, year after year, we meet in annual session to renew old and begin new friendships;

to present and discuss papers, gaining breadth of vision and inspiration, and taking from the common pool of ideas and suggestions according to individual needs, that which will be of value to those entrusting themselves to our care.

In a generation the requirements for a medical education, in time, effort, and money expenditure have enormously increased. My predecessor in his presidential address gave expression to the widespread dissatisfaction with the present-day training given by our medical schools. His opening sentence was, "The profession is earnestly demanding a thorough education in the fundamentals of all men who would presume to treat the sick." In this I believe we all heartily concur.

It is not within my knowledge that any medical school in this country has ever, of itself, turned out a graduate ready and fit to practice medicine. Please bear with me in being personal and concrete. For the past thirty-five years I have had somewhat to do with the appointment and instruction of graduates, internes, undergraduate pupils, and nurses. For instance, in 1924, in the Lying-In Hospital, we gave at least some instruction to 97 graduates, 116 undergraduates, 147 pupil nurses, and also 40 internes who served as House Surgeon or Assistant House Surgeon for a period of four months each.

In my graduation year, 1889, 207 men from a medical student body of between seven and eight hundred presented themselves as candidates for graduation, 153 of which were granted a degree of M.D. Nearly all had spent three years in the medical school; a few in this class were given their degree in less than two years from their first matriculation. I am in favor of a liberal general education for the medical man. It is doubtful whether a majority of the student body of my acquaintance had a general education beyond that of a high school; and yet, time enough has elapsed since then so that many of these men have become eminent, with well-known names in their chosen specialties, taken up after experience in general medicine. Besides meeting the requirements of the medical school we were grounded in theory under instructors of our own providing, thus supplementing the work of the college. These quiz classes were strenuous affairs conducted six days in the week and often well into the summer vacation. As an example of one day's lesson, we were required to know the relations of half of the arteries in the body, according to Gray.

Beyond any question there has been much improvement in the methods of imparting medical instruction; I am, however, very doubtful whether the finished product of the medical school of today is superior to that of a generation ago. Undoubtedly, there still are many fine young students graduated into our profession, and I believe just as truly, that owing to the cost in time, effort, and money, a number of that type which is needed find it impossible to study medicine. The present requirements are: a three year premedical course, four years in the

medical school and, although necessary but not required, at least two years hospital training, making an expenditure of nine years out of a very valuable portion of life, and also many thousands of dollars; with the result, I believe in all fairness, that the personnel of our medical student body and recent graduates has, on the whole, deteriorated, in so far as making them good practitioners of medicine is concerned. I find many of them possessed of a wealth of theoretical knowledge but rather innocent of the grasp and application of practical and well-established everyday methods. Two illustrations may better convey my meaning. On September 5, I was called in consultation by a man, I take it, of considerable native ability and several years experience in the practice of medicine. The patient was a young primipara, seven and a half months' pregnant, with symptoms of well-marked toxemia. She had been carefully watched and observations had been made. The history went back about three weeks, urine changing from normal quantity with a trace of albumin to a diminution of less than one-third normal output, boiling solid and filled with hyaline and granular casts. Blood pressure steadily and latterly rapidly increased from 130 to 160 and, when seen, 210. There was well-marked edema, persistent headache, pronounced insomnia and occasional blurring of vision. The young man's theoretic knowledge of blood chemistry and internal metabolism challenged my admiration; the laboratory had done its part in this respect, and yet, practically no attempt had been made to relieve the patient who was undoubtedly on the verge of an eclamptic seizure. Hospitalization and prompt, effective treatment began to show results for the better within six hours. Here we have an example which is not unique. The second example is as follows: I am at present interested in a young man, member of a large family with limited means, who is endeavoring to gain his medical degree from one of our prominent schools. In his high school course he maintained high rank. He has completed his first year in the premedical course, and by dint of working during the summer he is able to see his expenses provided for until after Christmas of the present year. If he attains the goal of his ambitions by his own efforts, it must be at a time well along toward middle life. This instance as you all know can be multiplied many times.

My experience with young graduates who have had a so-called one year clinical training—a few months in one place and then in another—is, that while this is better than no training at all, it is unsatisfactory in results, if they stop at that. This just and widespread dissatisfaction must in time result in improvement. How this is to be brought about I am unable to say. It seems to me that in some way the cost of time spent in securing the theoretic part of a medical education must be reduced, possibly by elective courses and the opportunity to take summer courses, to the end that students may begin hospital and practical work at an earlier age.

The nursing situation, as with many other phases of life and endeavor, appears to be passing through a period of unrest and evolution which is unsatisfactory to all concerned. Where, when, and how it will eventually become reasonably stable and satisfactory is, as yet, beyond the ken of anyone. Leaders of that profession seem to be at a loss in the matter, are uncertain in their aims and cannot foretell the outcome. In the meantime, the sick must be cared for. The nurses themselves are dissatisfied, and soon after graduation, we find a large number of them seeking social service and institutional positions. There appears to be a growing unwillingness to do bedside nursing. Something is wrong. It is too much to say that everything is all wrong in this respect as there are too many who are doing excellent work; otherwise we would be obliged to close our hospitals and call upon friends and members of the family to nurse the sick in their homes. Many young women of a type who formerly entered our training schools find industrial positions more attractive. We have more people, and, thus more ill people in this country. There are more hospitals,—all requiring nurses, and there is an increasing number of sick seeking hospital rather than home care. A given hospital finds it necessary to employ more nurses than was the case twenty-five years ago. The tendency has been to increase the requirements made upon pupil nurses before they attain their graduation. Undoubtedly, the standard of raw material applying to enter our training schools has, as a whole, deteriorated. This problem is too complex to allow of its being cleared up by any off-hand plan. I believe that two years training is ample for the ordinary nurse, and could be established to the advantage of all concerned. A nurse should be trained in all that pertains to keeping a ward or room in order, and the routine care of patients. That she should be called upon to do all of this work throughout her entire training, I do not for a moment believe. From experience we know that lay workers, who look upon much of the oft occurring routine as employment and without thought of being trained, can be utilized to advantage. The university education of four or five years may be essential to develop the types of nurses required as heads of training schools. It would appear that there must be at least two standards of training.

I have read the reports of our Committee on Maternal Welfare as they have appeared, with great satisfaction and approval. I believe that this Association is most fortunate in the personnel of this committee, and that we should give to each member our highest commendation for the excellent and far-reaching work which they have done. It would be an advantage to continue the present committee in office, and I would advocate it if they are willing to serve in this capacity. Such efforts as they are making are along the right lines. We may rest assured that accidents, morbidity, and mortality incident to child-

birth, will not be reduced to the possible minimum, and the best and safest form of obstetric care given to the women of our country as a whole, until the people—medical and lay—earnestly demand it.

When it is understood that 75 per cent of the disabilities and deaths due to childbirth are unnecessary and means taken to prevent such results, then we shall no longer be in the unevitable position in which we find ourselves today. Creditable reports state that annually at least sixteen thousand women in this country lose their lives in giving birth. It is probable that this estimate is too low.

Imagine for the moment a town of twenty thousand women inhabitants. Suddenly, some great disaster occurs wiping out sixteen thousand lives, injuring, and disabling the remaining four thousand. The front pages of our papers would be covered with a description of this tragedy; the resources of the national and local government would at once be put into activity in order to bring relief, and the world would look on in horror stricken amazement. And yet, because these casualties are spread out over the entire year, and this condition has existed for so many years, it attracts very little attention. We must remember that these women are not old and decrepit, the majority of them being young or in early middle life, many leaving young children motherless. The total loss is enormous and largely unnecessary.

The medical profession is not without responsibility in this matter, and it behooves us to set our own house in order, to encourage the improvement of obstetric practice, to find some means of discouraging the careless, incompetent practitioner whose obstetric results are habitually bad, and to enlighten the public, teaching them to demand better obstetric care.

Our present-day status is not a happy one to contemplate, but on looking back thirty or more years and comparing conditions at that time with the present, I think there is ground for much encouragement. The work of our Committee on Maternal Welfare has challenged the interest and cooperation of a wide medical and lay public.

Hospital facilities for the care of maternity cases are rapidly increasing. A perfectly equipped hospital plant in itself does not, of necessity, insure good results. In the main, maternity hospitals, and departments in general hospitals, are well supplied with competent attending staffs. It follows that more internes are given practical obstetric training, and that the lay public is beginning to realize the possibility of good obstetric care. There never has been a time in my experience when so many well-trained young men were seeking interne positions in obstetric hospitals. All this is very hopeful, but I am convinced that we should redouble our efforts.

From time immemorial attempts have been made to overcome or assuage the agony incident to childbirth. Herbs, especially the poppy, alcohol in various forms, and drugs, have been employed for this pur-

pose with only limited success. There has been and still remains a widespread belief that these attempts are wrong because they are held to contravene the divine decree concerning women in travail.

In the year 1848, Sir James Simpson began to use chloroform for this purpose. At once he was vehemently assailed from many directions, by fellow practitioners, the press, and from the pulpit. It is unnecessary to recall to you the history of the efforts and results along this line.

Ardent search has been made for some agent or method which should be without danger to mother or child, simple in make-up and application, inexpensive and readily available, and yet which should not retard the progress of labor.

Making liberal allowance for personal interest and lack of perspective, time and experience but confirm my belief that the Lying-In Hospital, in New York, by its development and use of morphine and magnesium sulphate hypodermically, together with the rectal instillation of ether and quinine, has come nearer to meeting these requirements than any other procedure thus far known. I am now convinced that this marks one of the great advances in obstetric practice.

It is inconceivable that too much credit can be given to Dr. James T. Gwathmey who initiated this work, under our direction, in the Lying-In Hospital, in February, 1923. He gave freely of his time and great knowledge of anesthetics, not only in the hospital but also in laboratory research.

We have been taught that quinine is not absorbed through the rectum. Occasionally ignorant women who had been subjected to this treatment reported slight ringing in the ears. Urinalysis from fifty different women revealed the presence of quinine in forty-five.

From time to time articles have appeared under the title "Painless Childbirth." In my opinion there is no such thing, and allowing for the uncertainty of prophecy, I do not believe there ever can be such a thing.

By the method to which I refer we have had several patients whose labors were absolutely painless from within half an hour after treatment was begun. We now have record of something over three thousand patients who have been given this treatment. During the past month, out of one hundred and twenty-three deliveries in our out-patient department, eighty-three were given this treatment with good results. I have yet to learn or to observe that any mother or child has been endangered by it.

For a time both in-patient and out-patient departments of the hospital became a clinical laboratory. By reports from patients and observation by nurses, internes, and the attending staff, we have been able to check up results. We began with combinations and doses so small

that no result was expected. Cautiously working up from these—eliminating that which promised to be useless or harmful, fortifying where necessary and safe—we have arrived at a simple standard of dosage and technic which may yet be modified in minor details, but cannot be changed materially in principle.

Where skepticism and indifference were present in our early experience, we now have enthusiastic teamwork in carrying out this treatment.

44 PARK AVENUE.

AN INQUIRY INTO THE NATURE OF CHRONIC APPENDICITIS*

BY ARTHUR E. HERTZLER, M.D., HALSTEAD, KANSAS

NOTHING is more confusing than the generally accepted notion of the pathology of the appendix. The whole subject is suffused with assumption and bad logic. While acute appendicitis is more completely worked out than any other intraabdominal lesion, chronic appendicitis, so-called, has no definitely established pathology.

The purpose of this paper is to examine the morphologic basis of chronic appendicitis and to inquire as to whether or not the clinical experience is in harmony with existing theories.

Material Employed.—Before an attempt is made to interpret pathologic changes in any tissue, it is necessary to secure a clear picture of the normal structure of the organ. With this object in view, I examined (some twenty odd years ago) 1187 cadavers of subjects dead of some disease not involving the abdominal organs. Special attention was paid to the appearance of the appendix at the various age periods, both as related to its histologic structure, its position and the existence of alleged adhesions. I have examined in round numbers 2000 appendices obtained at operations, the majority from my own practice, so that the clinical as well as the anatomic data are available for my study. I have pursued this study when material presented, covering the life period from early infancy to the most advanced years. By this means it is possible to determine, in a general way, a normal appendix for a given age period.

The real background for my viewpoint was obtained at a time when I was pathologist to a hospital of considerable size, and it was my duty to find evidence of chronic inflammation in appendices removed by my employers under the diagnosis of chronic appendicitis. This was during a period subsequent to the extended anatomic study above noted.

This paper has to do with the specific examination of 500 appendices removed at the Halstead Hospital between August, 1919, and April, 1924. Many of these were removed during the course of other operations, notably pelvic operations and operations on the gall bladder. None, however, was removed as a routine measure but only when there was a history of groin pains or symptoms sufficient to impress some one of my hospital residents with a possibility of involvement of the appendix in the light of his teaching in his undergraduate course or in his internship before becoming a resident in the Halstead Hospital.

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

In this way an independent diagnosis was obtained well up to the average in acumen and uncurbed by my own skepticism. A few were removed under the diagnosis of chronic appendicitis made by one of my assistants, and a number were operated on with the diagnosis of recurrent appendicitis in which the true diagnosis later became evident. A number of appendices were removed under wholly mistaken diagnoses as was revealed at operation or by the subsequent developments.

I have abstracted the case histories made by these residents, noted the gross appearance of the preserved specimens, and compared the slides with these in forming my conclusions. Whenever possible the after-course has been determined, particularly when no other lesion was found and the appendix appeared normal. The need of care in conducting the inquiry into the after course will be noted later. By checking these problems in these various ways, it is hoped that fairly reliable conclusions have been arrived at.

General Consideration of Pathology.—In the study of any tissue the subject of inflammation, it must be remembered that the term "inflammation" implies a local reaction to an irritant. It implies, therefore, a process and not a state. The failure to keep this obvious fact in mind is the fundamental error made by those who believe in the existence of a chronic appendicitis. A terminal fibrosis is not a chronic inflammation. Chronic inflammation in parenchymatous organs, it should be noted, does mischief only by strangling the parenchymatous tissue and not because of the fibrosis in itself.

A primal error made by many surgeons is in not distinguishing a relapsing acute inflammation from an alleged chronic one. They speak of a chronic appendicitis when they really mean a recurrent acute process. With these I have no quarrel. Their conceptions are fundamentally sound. It is their misuse of technical terms that is at fault.

It is well to think of an inflammatory process as made up of three stages or states; the acute reaction, the stage of repair, and the terminal fibrosis. A chronic inflammation is a progressive hyperplastic process due to a slight but constant irritant. Acute inflammation is usually due to one of the pus-producing organisms, while a chronic inflammation is due to some other organism, such as tuberculosis, syphilis, actinomyces and the like, or to attenuated organisms of the pus-producing group. In these lesions the inflammatory process progresses indefinitely and is, in reality as the term implies, a progressive chronic process.

With these preliminary remarks, we may proceed to look at the condition as found in the appendix.

Anatomy.—The appendix is a lymph organ resembling the tonsil more than the remainder of the intestinal tract. It differs from the intestinal tract chiefly because the submucosa is not separated from

the mucosa by a definite limiting membrane. This permits lymph cells to diffuse into the submucosa without encountering a continuous barrier. The result is that there are no sharply defined lymph follicles, but the border is formed by scattered lymph cells. The presence of cells in the wall of the small intestine and its mesentery, independent of lymph follicles, has been sufficiently described. They are found in all ages and in most animals. These are found particularly about the vessels in the mesentery as I have noted elsewhere. This relation to the lymph cells and to the fixed tissue cells is difficult to determine. These cells are often regarded as evidence of chronic inflammation. This is an error. The amount of connective tissue in the submucosa varies greatly. It naturally is more abundant and manifests its acidophilic character most strongly in the young when the lymph follicles are most prominent. Both factors lessen with the age of the individual. It is less in the corpulent. The muscle coats likewise are most prominent in the young and suffer malnutrition in the aged and the corpulent. Fatty deposits in the subserosa bear a general relation to the habitus of the individual and but little to his past diseases. The vessels in the submucosa and particularly in the serosa are more thickened in the ptotic individual. For a full consideration of this problem I refer to the chapter on "*Varicosities of the Peritoneum*" in my book on *The Peritoneum*. The presence of a large number of goblet cells and the partial loss of the surface epithelium is often spoken of as a catarrhal inflammation. The number of goblet cells varies, normally becoming progressively less with age, and the loss of the surface epithelium occurs readily in the ordinary technic of slide preparation.

What is commonly pointed out as a chronic reactive process, therefore, is nothing more than a variation of the normal. These facts account for extravagant estimates as to the proportionate number of appendices showing pathologic changes. An organ which performs its function, if it has any, in complete harmony with the well-being of the individual, must be regarded as normal. For instance, every thyroid gland shows morphologic pictures which, when emphasized, are pathologic. Yet it would but confuse to say every thyroid is pathologic because it does not fit the picture in the freshman's histology.

Before considering chronic appendicitis it is necessary first to consider the acute variety and to study in some detail the terminal processes in its recovery.

Pathology of Acute Appendicitis.—When the appendix is the subject of acute inflammation, a definite series of phenomena develop; bacteria gain access to the lymphoid tissue and there set up a reaction. Just how they gain entrance is by no means clear. Probably in most instances they gain entrance through an injured mucosa since the primary foci seem to be most frequently situated between the lymph follicles. In some instances the primary lesions are within the fol-

liele and, since these not infrequently follow close on an attack of acute tonsillitis, it is easy to believe the appendiceal infection in these cases is blood borne.

Unfortunately in most instances the disease has passed beyond the stage when the exact location can be studied before the appendix is procured. Be this as it may, the end-result is the same. Hyperemia and swelling (due to the hyperemia together with the exudate of serum) and the collection of leucocytes rapidly take place. The immediate result of this is a distention of the coats of the appendix, and the stretching of the sympathetic plexus of nerves contained therein, which register their distress in the semilunar ganglia, and we have nausea and vomiting and a distribution of the sense of pain throughout the ramifications of the plexuses hence, generalized abdominal pain. In the



Fig. 1.—Round-cell infiltration in the border between the lymph follicles and submucosa.

course of some hours the reaction, begun in the lymph tissue, has reached the muscle layer and then the serosa, producing a periappendicitis. This irritates the parietal peritoneum, and we have localized pain and muscular rigidity. The reasons for these conclusions I have presented elsewhere. The clinical history is now complete.

I desire particularly to emphasize the earliest changes in a beginning appendicitis. The round cells and the fixed tissue cells are the first to respond to the irritant. The lymph follicles likewise respond (Fig. 1). The cells in the submucosa become swollen (Fig. 2) as do those between the muscle fibers (Fig. 3). This has to do, be it noted, with the first reaction. These are the cells concerned in the subsequent fibrosis. The polynuclear cells appear later. If the inflammation increases in intensity polynuclear infiltration occurs, the vessels become involved, abscesses form, the tissues liquify and perforation occurs, and a localized

abscess or a general peritonitis follows. If a considerable vessel is occluded, gangrene may result.

The reason the generalized abdominal pain ceases after the first day is because the nerves within the walls of the appendix are destroyed when the reaction becomes intense. Only in the lesser degree of in-

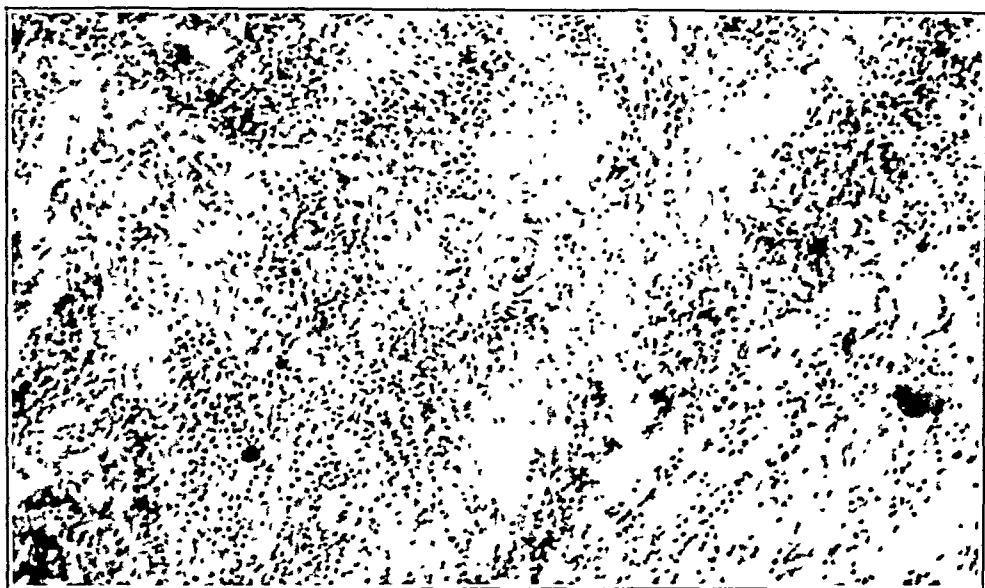


Fig. 2.—Round-cell infiltration of the submucosa.

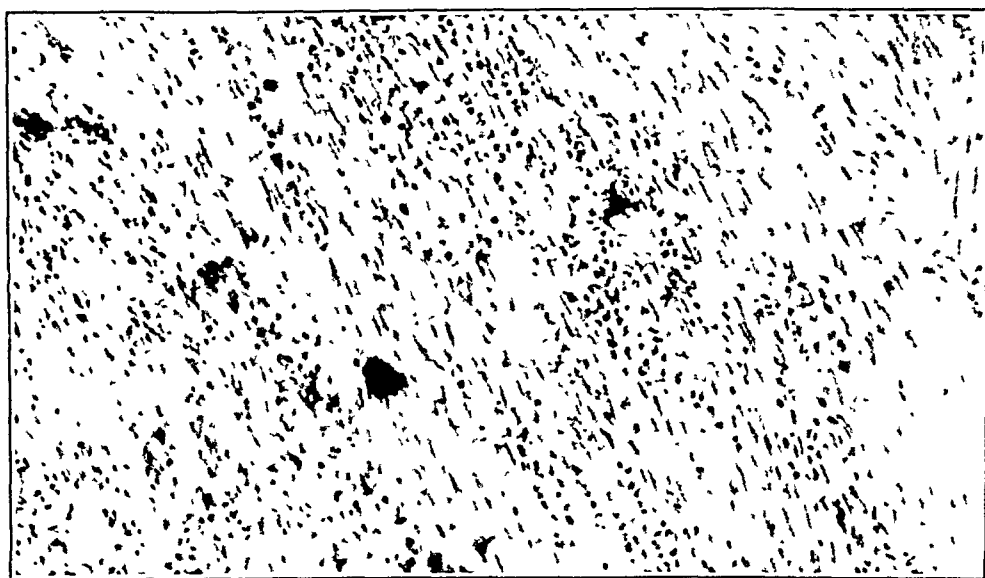


Fig. 3.—Round-cell infiltration between the muscle bundles. (Figs. 1, 2, and 3 from a patient 12 hours after the beginning of the fourth attack of appendicitis.)

volvement does the generalized pain continue. When a general peritonitis results, there is a generalized pain, but this pain is due to the involvement of the parietal nerves and not to the irritation of the sympathetic nerves. The significance of these very obvious observations is that the localized pain in appendicitis is not of the appendix itself but

of the parietal peritoneum or of the surrounding hyperemic but viable intestine.

Terminal Processes in Acute Appendicitis.—When regression begins after an acute appendicitis, restoration may be complete or partial. If the fixed tissue cells alone are irritated they return to normal, and the exudate is absorbed and restoration is quickly established. A moderate degree of polynuclear infiltration may regress without obvious change. We know that appendices removed after the subsidence of typical attacks may show no change. Material for such study was abundant during the time it was the general practice to remove the appendix in the interval for the purpose of preventing a recurrence of the attacks. When there is actual destruction of tissue, the matter is different. Parenchymatous tissue, actually destroyed, is not replaced

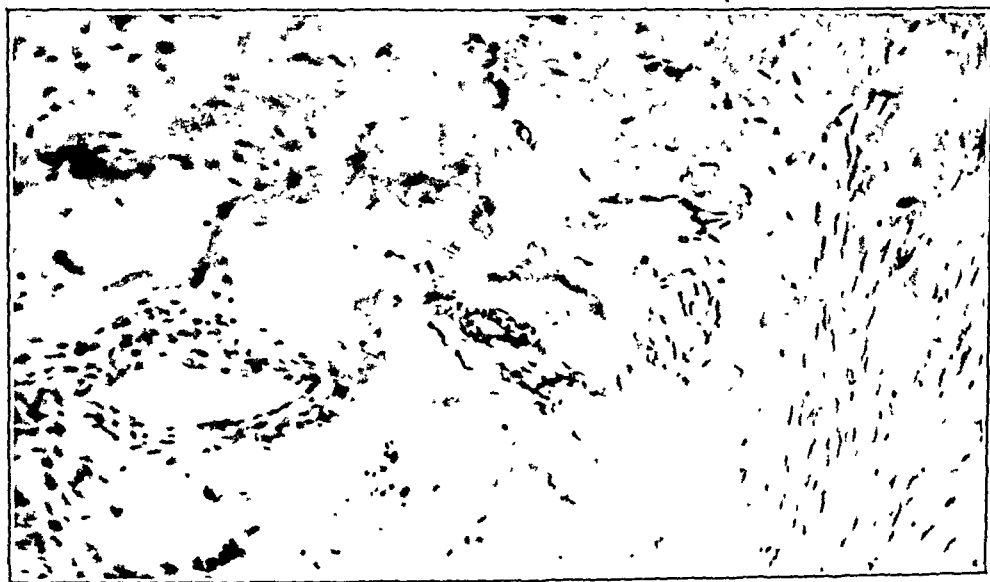


Fig. 4.—The lumen of the appendix is obliterated by the formation of fibrous tissue. (Last attack 4 years previous to operation.)

in kind, and some degree of scarring results. If the patient survives a gangrenous process the entire organ may disappear leaving only the mesoappendix to indicate its site. In lesser degrees the mucosa may be destroyed and be replaced by fibrous tissue which results in the obliteration of its lumen (Fig. 4), with less involvement of muscle bundles by fibrosis and a thickening of the vessel walls (Fig. 5). Examining some of these in detail, we observe (Fig. 6) an increase of the submucous connective tissue with dilatation of the vessels and a fibrosis of their walls. In some areas a regressing granulation tissue is seen (Fig. 7). Areas of definite fibrosis may replace the muscle (Fig. 8). The vessels of the subserosa may remain dilated (Fig. 9) giving a permanent redness to the organ, or the vessels may be larger (Fig. 10) appearing as distinct vessels to the naked eye. These last named changes, as I have fully described elsewhere, are most pronounced at

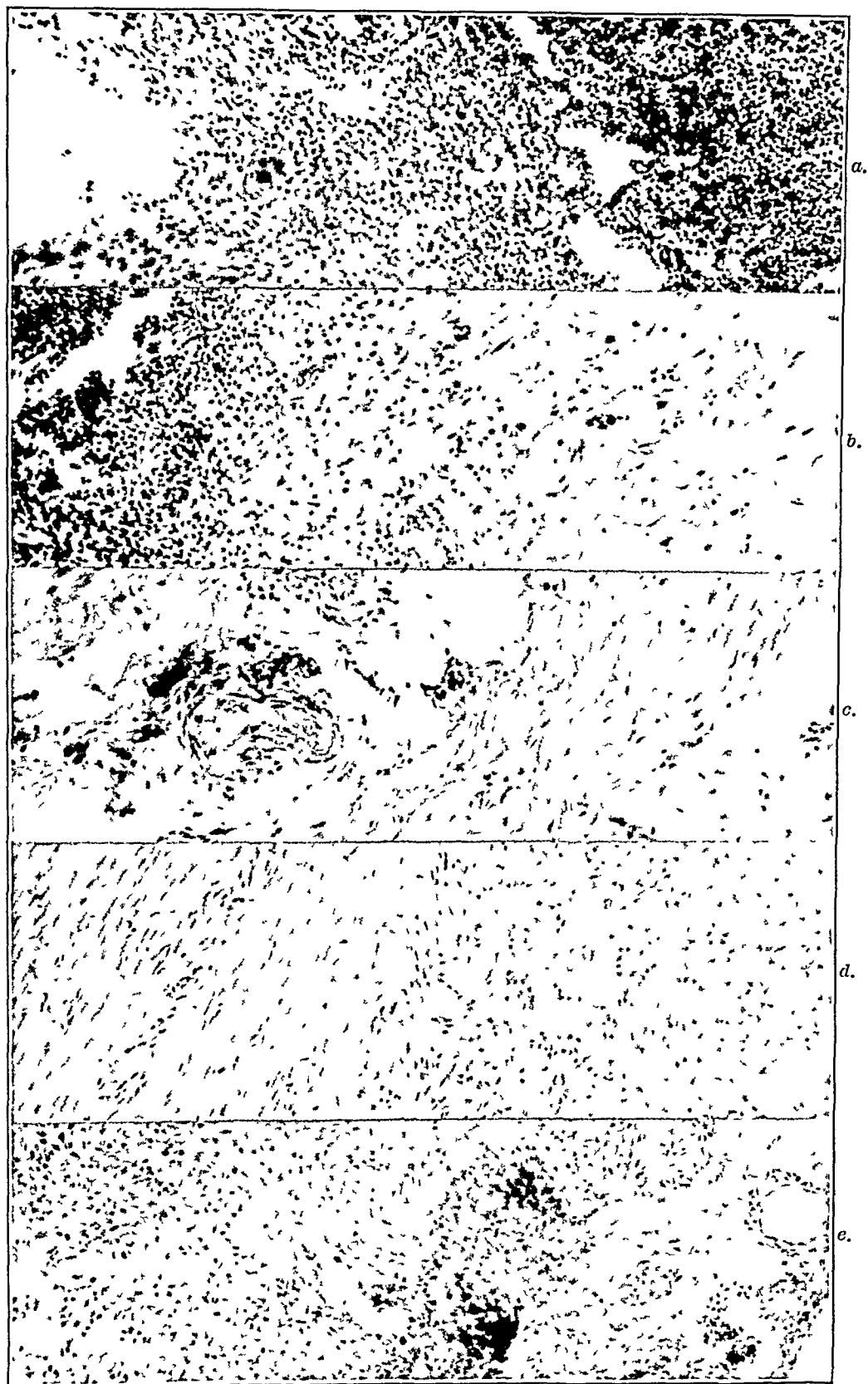


Fig. 5.—Section entirely across a healing appendix removed 21 days after the beginning of the fourth mild attack; *a*, the mucosa; *b*, border of mucosa and submucosa; *c*, submucosa and muscular layers; *d*, muscular layer; *e*, muscular layer and peritoneum.

some distance from the most intense reaction. These changes result in the production of the so-called Jackson's membrane.

Some or all of these changes may be found in appendices which have



Fig. 6.—Edge of lymph follicle showing walls of thickened vessels and increase in the fibrous tissue of the submucosa. (Appendix removed while repairing a scar hernia resulting from the drainage of an appendiceal abscess.)



Fig. 7.—Chronic granulation tissue in the submucosa corresponding in histology to the pyogenic granulomas of the dermatologists. (Appendix removed 4 months after an acute attack.)

undergone inflammation, particularly in those the subject of repeated attacks. Generally speaking the healing process is completed in a few weeks, in the mild cases, and in two or three months in the severe cases when there is a loss of parenchymatous tissue substance. In rare instances this time is extended.

It is important to remember that such changes represent evidences of past inflammation but do not represent chronic inflammation in any proper sense of the term. It must be constantly kept in mind that such appendices were removed, not because they inconvenienced the

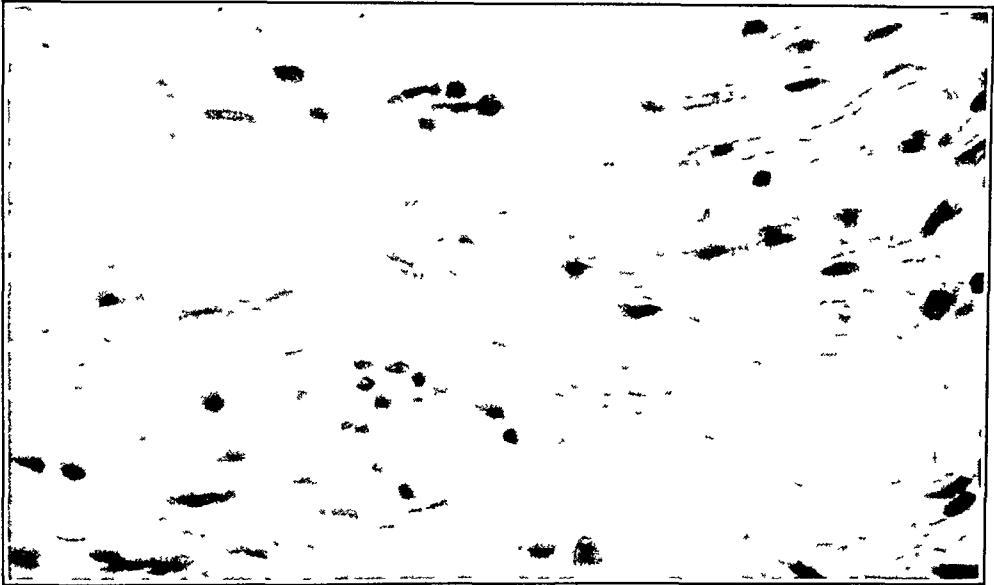


Fig. 8.—Fibrosis of the muscle layers, obtained while repairing a scar hernia.

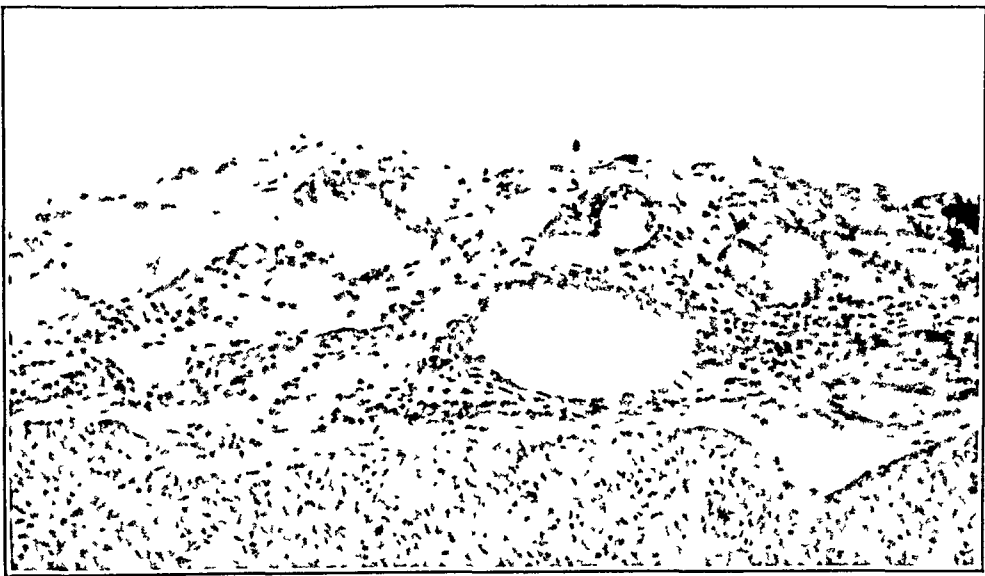


Fig. 9.—Dilated vessels of the subserosa with increase of the connective tissue. (Appendix removed 7 days after the beginning of the attack. A number of mild attacks had preceded.)

patient in the least, but solely to prevent a recurrence of the attack, or while repairing a scar hernia incident to the drainage of an appendiceal abscess, as was a common practice a generation ago.

Chronic Appendicitis.—I have examined the changes incident to acute appendicitis. I have reminded you that these fibrotic changes

forced there by the pressure of the amniotic fluid. Hüter was of the opinion that standing and walking during labor pains favored a prolapse of the placenta. L. Müller thought that the presenting part could push the placenta loose from its attachment and out into the vagina. When the placenta is marginal the detachment of the placenta can be caused either mechanically by the uterine contractions, or by changes in the placenta itself. Prolapse of such a placenta may be prevented by pressure of the presenting part. If, however, as in Ross' case the head remains high or if there is a malposition there is nothing to prevent the prolapse of such a placenta.

In the cases of normally implanted placentae, the cause of the detachment is obscure. Toxemia has not been a prominent feature of the cases that have been reported, nor do the patients have the shock, and other symptoms we are accustomed to see ordinarily in cases of ablatio placentae. Lange, Spiegelberg and Schröder called attention to the fact that most of the prolapsed placentas occur in twin pregnancies, after the birth of the first child. It is possible that a sudden shrinking of the area of the inner surface of the uterus might cause the separation of the placenta. The escape of the great excess of amniotic fluid in Larisch's case might have played a similar rôle. The prolapse of the placenta, once it becomes detached, would be possible in twin pregnancies as cited by Lange, Spiegelberg, and Schröder, when the second twin does not quickly occupy the pelvic inlet. In Münchmeyer's first case the prolapse was possible because the large fetal head did not engage in the flattened pelvis. In Larisch's case the transverse position of the child allowed the placenta to prolapse.

Symptoms.—Hemorrhage is the outstanding symptom, in fact the only symptom, in these cases. It is usually the first symptom in the previa cases. When the placenta is located in the body of the uterus, the hemorrhage may not occur until after the labor is well advanced. In Larisch's case it did not occur until after the bag of waters broke. It may even be absent altogether. In neither of Münchmeyer's cases was there any bleeding before delivery and only the usual loss of blood afterwards. Simpson emphasized the fact that the hemorrhage ceased when the placenta was entirely detached. He was so impressed with this that he advocated the artificial extraction of the placenta in certain cases of placenta previa and actually practiced this method of stopping the hemorrhage in at least one case.

The diagnosis rests upon finding the placenta either in the vagina or entirely outside the body. The accident should be suspected in twin pregnancies when the fetal heart tones of the undelivered child are no longer heard. The only problem in diagnosis that prolapse of the placenta presents is the question of the location of the placenta. Larisch's reasons for believing that the placenta in his case was normally implanted covers the chief points in differentiation. They are (1) no

sents is "nervousness, headache, melancholia, irritability, insomnia, dizziness, general weakness, poor appetite, inability to think clearly and habitual constipation. I become afflicted with all these symptoms whenever I contemplate the picture of chronic appendicitis. Another reports a case in which a twist in the pedicle of an ovarian cyst was caused by a chronic appendicitis. Another presents as signs of chronic appendicitis intestinal atony, obstipation, anemia, nervous symptoms, and tenderness in the region of McBurney's point. Papers expostulating on the relation of chronic appendicitis to menstrual disorders are innumerable. One writer had six cases and rushes into print. Such citations could be multiplied indefinitely. The relation of chronic appendicitis to intestinal tract hemorrhages has been mentioned in several papers. One writer, for instance, reports fifteen cases. His diagnoses were made, it should be noted, by the x-ray, and the opinion was based on the fact that there was distortion of its caliber and course.

It is not my purpose to consider such lamentably puerile clinical logic. The only evidence adduced is that the symptoms complained of disappeared after the removal of the appendix. It is just such loose thinking, if you wish to call it thinking, that has made possible many of the operations we would like to forget. I may mention castration of females for almost anything; of males for prostatic enlargement; nephropexy for whatever ails you; Lane's kink for anything from constipation to breast cancer.

A few only of the more sane theories, if they be such, may be examined more seriously. I will consider first the relation of chronic appendicitis to gastric hemorrhage. In my earliest years I saw a young man who had epigastric disturbances and pain in the appendiceal region. I removed his appendix. He died from hematemesis. The autopsy showed that he had an ulcer. I had his normal appendix. Just imagine that some morning you were greeted by the announcement that fifty or a hundred of your patients had died during your absence. My entire surgical practice had died! In none of the cases reported that I have encountered was there evidence that any relation existed between the appendix and the hemorrhage. No case is even worthy of serious consideration that is not accompanied by a complete autopsy or examination of the stomach at operation. Even the absence of a demonstrable ulcer at operation would be insufficient to declare its absence. We know how difficult it is sometimes to find an ulcer even at autopsy. Even if ulcer does not exist there is no evidence that the appendix had anything to do with the hematemesis. In none of the reported cases was there even an attempt made to prove a relationship. Mine is the only case I know of in which there was any attempt to find out the facts in the case, and my patient had a definite ulcer and a normal appendix.

It is particularly in relation of so-called chronic appendicitis to

disturbances of menstruation that I have devoted my best efforts. Pain and tenderness in the groins are usually the only evidences that exist in these cases on which to base the diagnosis of appendicitis. Perchance there may be digestive disturbances. The difficulty here lies not only in ignoring the anatomic findings in the appendix but in failure to recognize the fact that there may be ovarian pain without pathologic changes in the ovary. We may have headaches without diseased brains and we may have ovarian pain without diseased ovaries. I mention these very obvious facts because so frequently operators, not satisfied with the removal of the appendix, which evidently seems insufficiently diseased to cause the symptoms complained of, attack the ovaries. Here is where the doctrine of chronic appendicitis plays its havoc.

Pathology.—What do we find in the laboratory when we examine the appendices removed from this motley horde? During the years I served as pathologist to a hospital, appendices removed under the diagnosis of chronic appendicitis, I classified somewhat as follows: if accompanied by an ovary or two, it was from a dysmenorrhoeic young woman; if long and thin with prominent vessels in the serosa, the patient was a woman with retroflexion, or a male with poetic tendencies; if small with fat mesoappendix, a woman near the menopause; if normal in size with a fat mesoappendix accompanied by gallstones, I knew the surgeon believed there was some relation between the appendix and gall bladder disease, and so on down the line. What did the slides show? Nothing! But as an exhospital pathologist I know what one should find and must find—either them or a new job! Some exfoliation of the epithelium and some hemorrhage in the lumen, particularly if the operator is inexperienced. Diminution in the number of goblet cells (Fig. 11). This can be emphasized if the section is made near the lip of the appendix. Emphasize the large number of mononuclear cells in the submucosa (Fig. 12). Increase in the connective tissue of the submucosa, is particularly to be emphasized if the patient is no longer young. Spaces between the muscular bundles are widened (Fig. 13). To get the full effect of these muscle changes the warm specimen should be hardened in strong alcohol and sectioned in paraffin. Hyperplasia of the vessel walls may always be recorded with safety because the thickness of the appendiceal vessels has not yet been standardized. (The American College of Surgeons has not got to this yet.) This cannot be used in young subjects, but comes in strong in poetic females and in old ladies with gallstones.

These are the alleged changes to which the symptoms of the patient complaining are supposed to be due. I have seen all these things in countless hundreds of patients who had had no abdominal complaints whatever. I believe they are normal appendices. I have made these reports just as other pathologists are making them today. Don't blame

the pathologists. Who wants to report a normal appendix when the head professor made the clinical diagnosis of chronic appendicitis?

As a reformed pathologist I haven't a particle of hesitancy in de-



Fig. 11.—Normal mucosa and lymph follicles showing the indefinite line of demarcation between the latter and the submucosa. (Appendix removed by a competent surgeon as a chronic appendicitis. Pains recurred six months later. Patient then had a marked interstitial goiter. Both goiter and groin pains disappeared under treatment with potassium iodide and sodium bromide.)

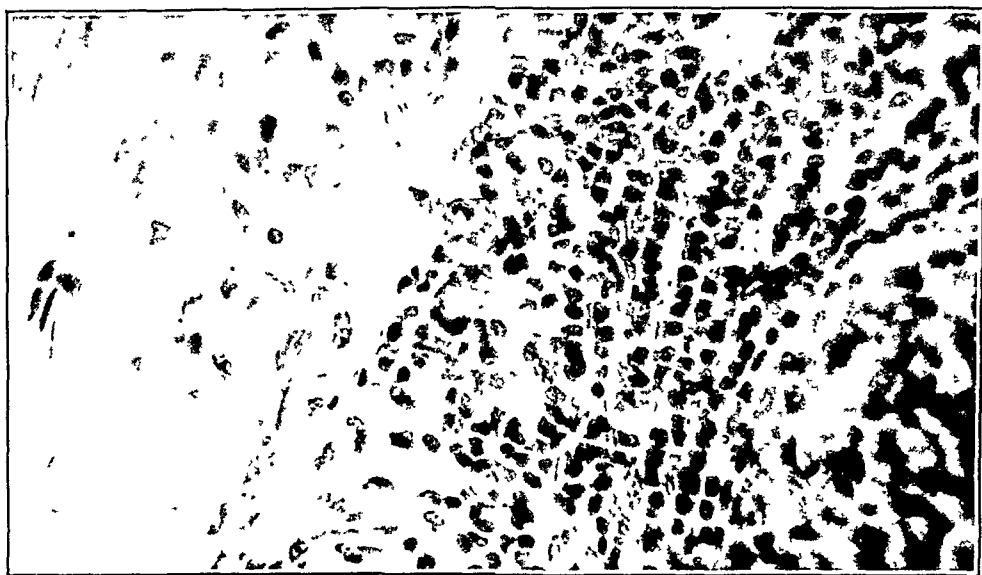


Fig. 12.—High power of the preceding.

claring that a pathologic basis for chronic appendicitis does not exist. The minimal changes noted by pathologists do not differ from those found in persons not complaining about anything. Those appendices in which changes are found to an unmistakable degree are found in

persons who have had an acute attack of appendicitis but who no longer have any complaints referable to the appendix.

It would seem the slight changes alleged to be found would test the credulity of any one. A few desquamated cells (Did you ever examine feces under the microscope?), a few round cells in the submucosa, increase of connective tissue (a relative thing at best). One must remember that no such minimal changes would produce symptoms in any other part of the body. All other abdominal organs are scarred vastly more without a symptom. Why should this vestigial remnant be the focus for so much evil? It must be something apart from any other known tissue. There is no evidence that it is. I can believe the pineal gland is the seat of the soul because there is no evidence of any kind



Fig. 13.—Increase in intermuscular spaces. (Appendix removed from an aged individual. No history of any abdominal complaint.)

regarding it, but that the appendix is the seat of so much mischief is incomprehensible because there is so much evidence to show that it is not true.

I wish to note that in rare instances there is a chronic *granulomatous* process in the appendix which is associated with indefinite abdominal pain and stomach disorders. I have seen three such cases. In clinical course and anatomic findings these differ much from the chronic appendicitis of common clinical parlance.

Causes of the Symptoms of Chronic Appendicitis.—As a pathologist I am utterly devoid of any knowledge that can clear up the problem of chronic appendicitis. As a clinician I am not so helpless. I have records of some 2000 patients who had pain and tenderness in the region of the appendix who did or did not have the appendix removed. It is the after course that counts here. In analyzing this material one must divide them into several classes:

1. Cases in which the removal of the appendix was followed by the relief of the pains formerly complained of.
2. Cases in which the pains persisted or returned, after an interval of freedom, after the removal of the appendix.
3. Cases in which the error in diagnosis became obvious later on.
4. Cases in which the groin pains were relieved without molesting the appendix.

Now let us consider each of these in turn:

1. Those in which the removal of the appendix "cures." Symptoms relieved by the removal of the appendix must have been due to the appendix is the gospel here. This is the one point on which the whole fabric of chronic appendicitis rests. It is a general experience that almost any sort of an operation will relieve almost anything for a time. The various operations done for epilepsy is a case in point.

In considering the results after the removal of the appendix, several other factors must be taken into account. Follow-up history by letter is of but little use because patients are prone to assume that symptoms they suffer from after the removal of the appendix must be due to some other cause. A careful history should be obtained from the patient as to the symptoms complained of before the operation was done and these compared with the symptoms still complained of. It is common to find patients declaring that their appendiceal symptoms were relieved by the operation but now they suffer from adhesions or from some other cause. One should also seek other changes in conditions since the operation. They may not have been relieved at once, but after bearing a child, or passing a kidney stone, or having a pelvic repair, the appendiceal symptoms may first have disappeared. The relation to associated events must be noted. Groin pains in lovers of either sex are relieved by appendectomy if followed soon by marriage or the administration of bromides. It is necessary to consider carefully the type of patient with which one is dealing. They are usually ptotic, neurotic, and subject to suggestion. Otherwise, they would not have chronic appendicitis. Mere alleged relief of symptoms in such cases is secured in many instances by the chiropractics. This fact alone should make us pause.

2. Commonly, particularly in dysmenorrheic young women, these symptoms, if relieved at first by the operation, later return. These patients observe that the operation did them no good. If not followed for a sufficient length of time, such patients may remain on our records as cured. Unfortunately this type of patient is apt to consult some one else because they feel the first one consulted failed in his efforts.

3. In some cases the same symptoms do not return but others develop which, together with the normal appendix in hand, is evidence sufficient to prove the error of the first diagnosis. A common example

of this sort is found in kidney stones and gallstones. The first symptoms may be indefinite and lead to the removal of the appendix. When the presence of stones becomes evident and one gets out his old slides a flood of light descends upon him.

4. Relief of the "Chronic Appendicitis" symptoms without molesting the appendix at all is the most impressive means of determining the value of the symptoms of a "chronically inflamed appendix." If one will follow the dictum that any chronic or persistently recurring pain in the right groin is not appendicitis and begin a careful clinical investigation, a removable cause will usually be found. I have elsewhere discussed the relation of these pains to ovarian dysfunction and need not repeat the discussion here. I have also mentioned the pains ardent wooers have. The same applies to seminal vesiculitis, many other diseases of the genitourinary tract, pyelitis, gallstones, spastic constipation and many others, not to mention the surgeon-patients who believe in chronic appendicitis, which is of course merely a hypochondria.

CONCLUSIONS

1. Fibrotic changes in the appendix, no matter of what degree, are not attended by clinical symptoms.

2. The anatomic structure of appendices commonly removed under the diagnosis of chronic appendicitis show no variation from the appendices of individuals suffering from no abdominal complaint whatsoever.

3. The minimal changes alleged to be present in cases of so-called chronic appendicitis are wholly inadequate to explain the symptoms ascribed to them considered in the light of like changes in other organs of the body.

4. Mere alleged relief after the removal of the appendix of symptoms is not sufficient to prove that the appendix was the cause of the symptoms.

5. The vast majority of patients so operated on do not even claim relief of their symptoms.

6. The symptoms alleged to be due to chronic appendicitis can be relieved by searching out the actual cause and by removing it, relieving the patient without molesting the appendix.

(For discussion see page 217.)

INVERSION OF THE UTERUS*

BY LOUIS E. PHANEUF, M.D., F.A.C.S., BOSTON, MASS.

INVERSION of the uterus is an extremely rare condition. The lesion may have a gynecologic or an obstetric origin. The gynecologic inversions are due, in practically all cases, to a pedunculated myoma or sarcoma. The obstetric or puerperal inversions are complications of the third stage of labor. In this paper, the discussion will be limited to the puerperal inversions. These are classified as incomplete when the fundus of the uterus passes no further than to the cervix, and complete if any part of the corpus uteri passes through the cervical ring. In extreme cases inversion of the vagina accompanies that of the uterus. Most writers consider as acute all cases which have lasted one month or less, while those which have passed beyond this period are spoken of as chronic.

A review of the literature shows that this obstetric complication occurs on the average of once in 125,000 labors. Yates¹⁹ feels, however, that since the statistics published are collected from the large and well-conducted obstetric clinics, the incidence is apt to be low in comparison to what it would be were statistics available for patients treated in private practice, in their homes, by men less skillful in the practice of obstetrics. With constantly improving obstetric practice, the lesion is gradually getting even more infrequent.

Although spontaneous inversion may occur, one of three factors is usually necessary for the production of this condition; namely, undue relaxation of the uterine wall, pressure from above, and traction on the funis from below. In addition the employment of the Credé expression on a relaxed uterus, or before placental separation, the erect posture in labor, a short cord, straining of the abdominal muscles during labor, coughing, sneezing, fundal implantation of the placenta, and the pressure of submucous fibroids during pregnancy are all contributory factors.

Since the placenta is usually inserted nearer the fundus in primiparae than in multiparae, and also on account of the greater vigor of the uterine muscle during a first labor, primiparae are more disposed to have this complication of labor. If uterine relaxation were the main cause of inversion, the lesion would be more frequent in multiparae where inertia is more commonly found.

Jones¹⁴ described the active mechanism of inversion as follows: "After any portion of the uterus becomes indented to a considerable

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

extent the rest of the organ seizes this invaginated portion as it would grasp a foreign body, and in attempting to expel it, turns itself inside out."

In the acute cases the symptoms are profound shock, hemorrhage, and pain. In the chronic cases one finds backache, bearing down pain,

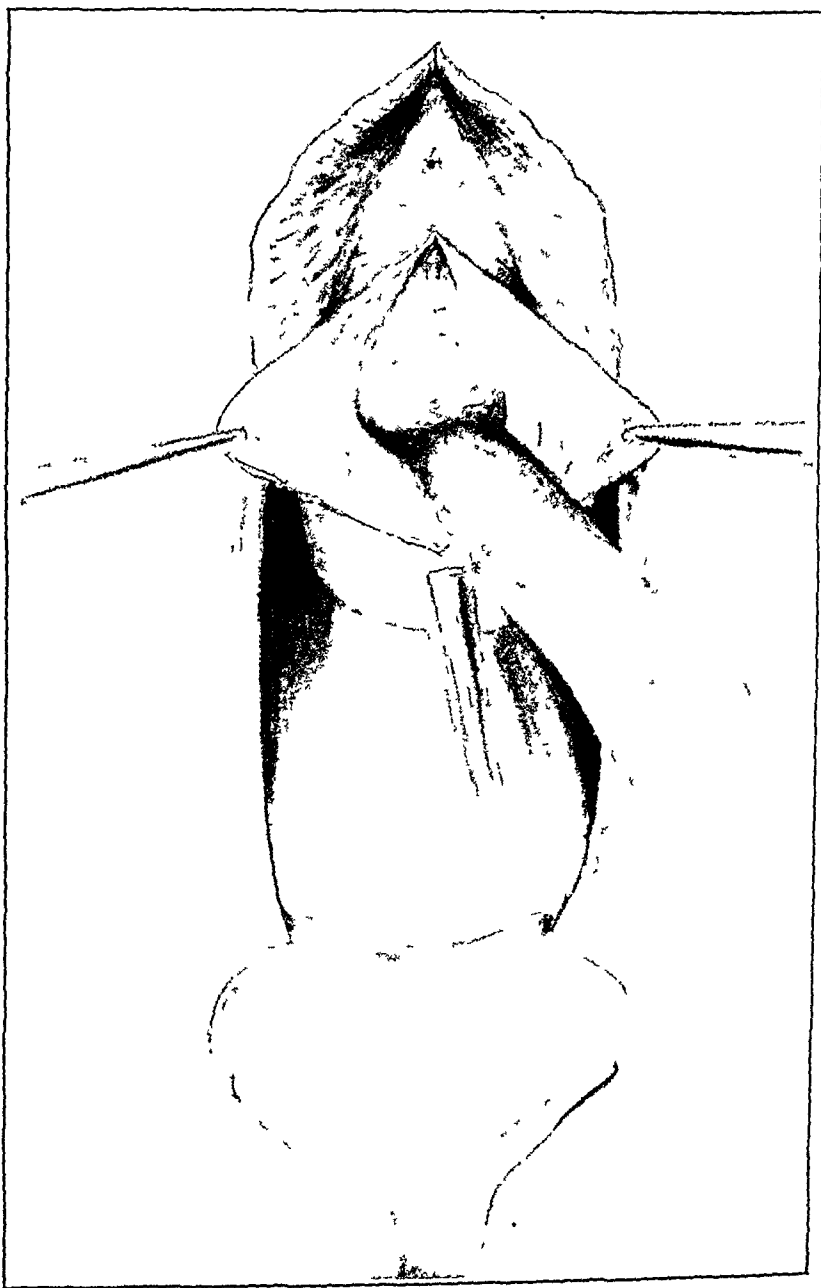


Fig. 1.—Anterior colpohysterotomy (Spinelli operation). The anterior vaginal incision has been made. The finger is separating the bladder from the cervix.

bladder and rectal tenesmus, anemia, resulting from the persistent loss of blood, and signs of low grade sepsis.

The diagnosis is made largely by examination. In inversions from obstetric causes there usually exists no difficulty. On inspection by means

of a speculum there appears a soft pear-shaped tumor filling the vagina. The covering of the tumor consists of the uterine mucosa; this may be dark red in color in the early cases, and grayish in appearance in the more advanced ones. On vaginoabdominal palpation no fundus is found, but there exists a cup-shaped depression in its place. The rectal

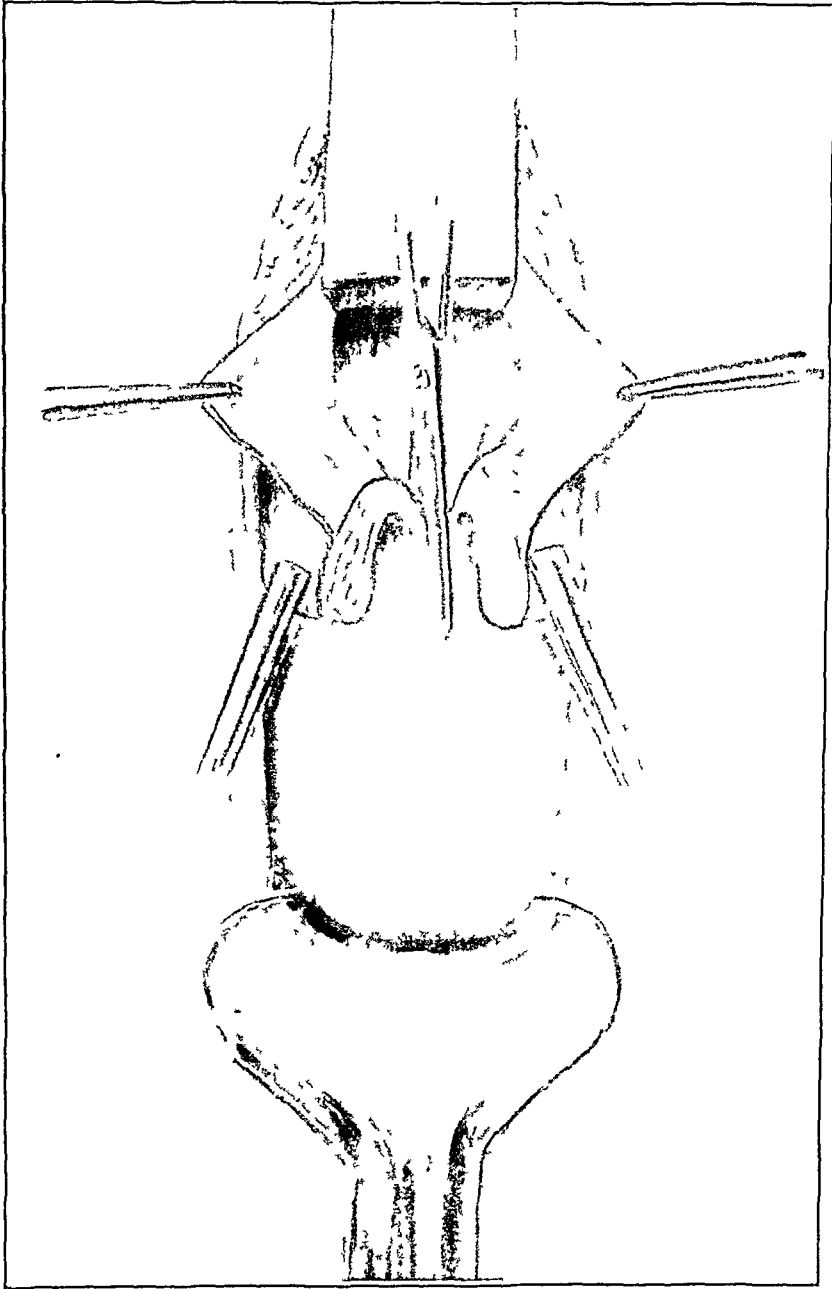


Fig 2.—Anterior colporrhaphy (Spinnelli operation). The anterior vaginal wall has been incised, the bladder has been separated from the cervix, the peritoneal cavity has been opened, and the bladder is held under the retractor. The cervical constriction ring has been divided, and the incision is continued along the anterior uterine wall to the fundus

examination is of great value in determining this depression. The indentation produced by inversion is characteristic of the condition, and is absent in other lesions from which it has to be differentiated.

In recent years the prognosis is gradually improving. The mortality has been about 34 per cent in the acute cases; in the chronic ones about 6 per cent. Some authors have quoted the mortality as high as 80 per cent, but this was before the days of aseptic surgery.

The treatment is nonoperative or operative. Jones¹³ in an extensive study of the subject, has tabulated all the accepted methods of treat-

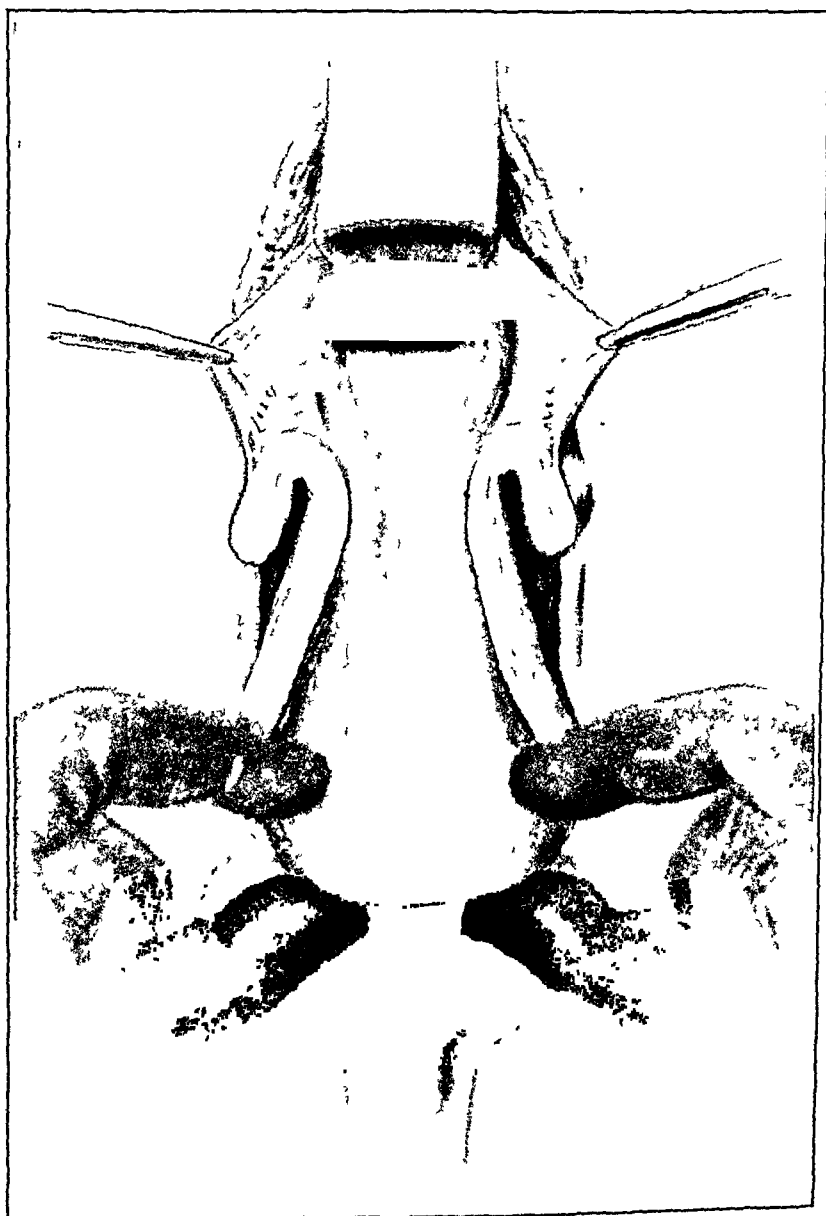


Fig. 3—Anterior colporrhaphy (Spinnelli operation). The uterus is turned inside out. (After Crossen)

ment, and Day⁶ has well summarized the vaginal operations for chronic inversion.

Briefly the noncutting procedures are manual reposition, and pressure applied to the fundus of the uterus from below by means of colpeurynters, the gauze pack, and elastic pressure.

The operations performed for this condition may be abdominal or vaginal. The abdominal methods consist of dilatation of the constriction ring from above, and the reposition of the uterus from below with or without preliminary incisions, and abdominal hysterectomy. The abdominal operations are of special value in the recent cases which cannot be reduced by taxis.

In chronic inversions most operators choose the vaginal route. The operations consist of anterior or posterior colpohysterotomy in cases

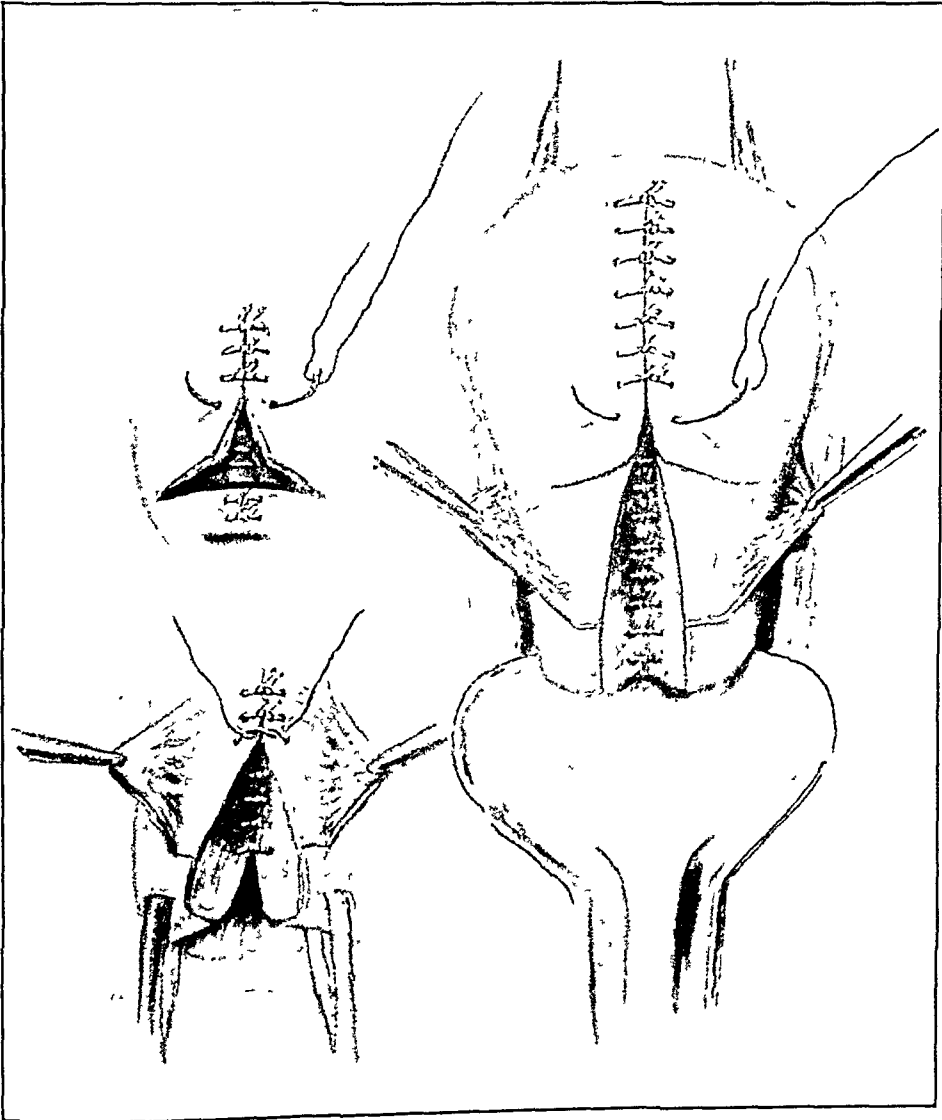


Fig. 4.—Anterior colpohysterotomy (Spinelli operation). The uterus is sutured in two layers with interrupted sutures of No. 2 chronic catgut. The vaginal incision is closed with interrupted sutures of the same material.

where the uterus can be saved, and vaginal *hysterectomy* where the opposite is true, and especially in the presence of gangrene of the uterine body. The names of so many operators are attached to these operations, which are all modifications of the same principles, that to mention them all is not possible in a short paper of this type. The

principles involved are incision of the vagina, of the constriction ring and of the uterine body, either anteriorly or posteriorly, the reinversion of the uterus, and the suturing of the incisions. Those who favor the posterior incisions, posterior colpohysterotomy, do so on the grounds that there is no danger of injury to the bladder and ureters by this procedure. On the other hand, exposure of the uterus and incision of the organ posteriorly is sometimes difficult, and again the sutured uterine incision is more likely to become adherent, leading to an adherent retroversion.

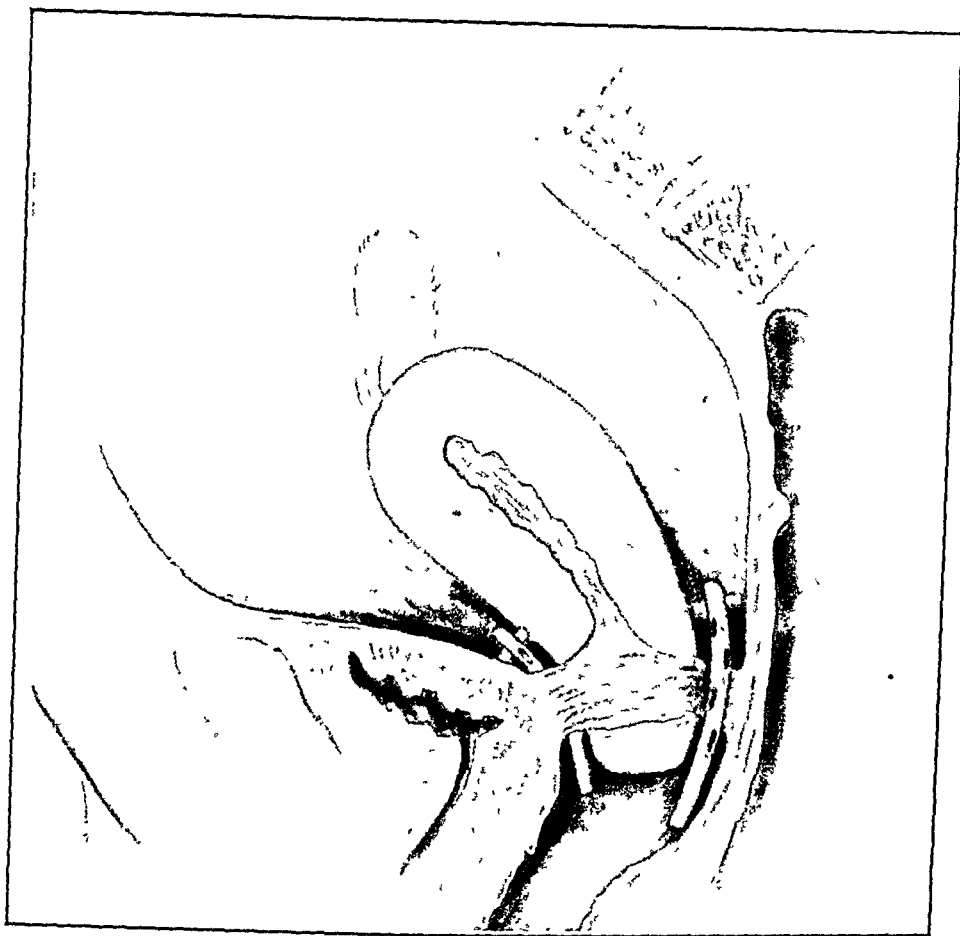


Fig. 5.—Anterior colpohysterotomy (Spinelli operation). Drainage established. Rubber tube drain in both the anterior and posterior culdesacs.

The objections to the anterior incisions, anterior colpohysterotomy, are injury to the bladder and ureters; yet this danger is almost negligible, and is not greater than when operating for an extensive cystocele. In the case which follows in detail and in which I did the anterior colpohysterotomy, the so-called Spinelli operation, no difficulty whatsoever was encountered in separating the bladder and in opening the peritoneal cavity. One striking advantage of this method is the fact that at the completion of the operation the anterior uterine incision is largely covered by the bladder, thus minimizing the possibility of subsequent adhesions.

Drainage should always be instituted, as the repaired uterus is considered as infected. Following anterior colpohysterotomy, anterior and posterior drains are usually employed. The anterior drain is placed between the uterus and the bladder, and allowed to make its exit through the anterior colpotomy incision, while the culdesac of Douglas is readily opened to place the posterior drain. The adherents of the posterior method only drain posteriorly through the vaginal incision already made.

Peterson,¹⁷ in 1907, wrote in detail about the Spinelli operation, and reported a case with recovery.

Thorn,¹⁸ in 1911, published a very exhaustive review of this subject and reported 641 cases gathered in the literature of the civilized world for the twenty-two years previous to 1911. In more recent years, Campbell,¹ Cohen,² Courty,³ Culbertson,⁴ Dantin,⁵ Day,⁶ Evans,⁷ Fruhinsholz,⁹ Huntington,¹¹ Jones,^{13, 14} and Lorient,¹⁵ have written on acute puerperal inversion and have reported cases.

Day,⁶ French,⁸ Gaudino,¹⁰ Jensen,¹² and Miginiac,¹⁶ have published their observations in regard to chronic puerperal inversion.

REPORT OF CASE

Mrs. M. D., aged twenty-seven, a secundipara, born in Massachusetts, was admitted in labor to the Carney Hospital, on June 26, 1924. She had had measles and pertussis in infancy; her tonsils and adenoids had been removed when she was seven years old. Menstruation was established at the age of fourteen; her periods were regular, every twenty-eight days, and lasted four days; two napkins were used daily and no clots were passed. Her last period had been on September 20, 1923, making her confinement expected on June 27, 1924. The patient had been married three years, and this was her second pregnancy. Her first child was delivered at eight months for toxemia and was stillborn. She had been well throughout the present pregnancy, and although albuminuria was present, no other signs of toxemia were observed. Her pelvis was ample.

The patient started in labor at 3 P.M. on June 26, 1924; two hours later the membranes ruptured spontaneously. She was given one-half c.c. of pituitary extract when her cervix was fully dilated. She was delivered by low forceps, of a female child, weighing 8 pounds and 6 ounces, by a member of the attending staff, at 7 A.M. on June 27, 1924. The placenta, which was inserted at the fundus of the uterus, was firmly adherent, and in attempting the Credé maneuver, the attendant inverted the uterus. The placenta was then peeled from the fundus of the inverted uterus; the organ was reinverted manually, without difficulty, and packed with sterile gauze. One c.c. of a sterilized preparation of ergot, was injected intramuscularly. Four ounces of ether had been administered during the delivery. One hour after labor the uterus was flabby and signs of a slow and persistent hemorrhage were observed.

I saw the patient at 11 A.M., four hours after delivery, while making hospital rounds. She was then pulseless, was bleeding freely, showed signs of air-hunger, and her condition looked desperate. At 11:30 A.M. she was given 1,000 c.c. of salt solution subpectorally. At 2 P.M. she was given a blood transfusion of 600 c.c. from her brother, by the citrate method. Her condition rapidly improved following this. She was discharged from the hospital on July 13, 1924, after an otherwise uneventful puerperium, by her obstetrician, who did not make a pelvic examination

at the time of discharge, and for this reason no note was made on the record as to the condition of the uterus. One week later I was called in consultation by her physician, who felt that he had discovered a uterine prolapse. I saw the patient in her home and because of the lack of aseptic conditions preferred to do the internal examination in the hospital and advised her to come there at once. My advice was not taken, however, for she did not report until July 29, 1924. Upon admission, the patient stated that since leaving the hospital she had noticed loss of support and weakness. Upon standing, the parts protruded through the vulva, and she felt more uncomfortable from day to day. There was a persistent sero-sanguinous discharge. For the two days previous to her admission there had been some bleeding, amounting to stains of bright blood on her pad; she had passed a small clot the day before entering the hospital. She had been free from pain, her appetite had been excellent, and her bowels had been regular with the aid of laxatives. There had been some difficulty and burning at micturition, but at the time of admission, there was only slight difficulty in starting the stream. The urine had not been observed to be bloody, cloudy or colored.

Examination.—On separating the labia, it was evident that a complete inversion of the uterus existed. The uterine mucosa was grayish in appearance, bled readily on sponging, and the typical cup-shaped depression was apparent on vagino-abdominal palpation. The cervical constriction ring was so tight around the uterus that it was impossible to reinvert the latter by taxis. The perineum appeared to have been recently repaired. The abdominal walls were considerably relaxed, otherwise the abdomen was normal. The heart and lungs were normal. The urine showed nothing remarkable.

Operation.—On July 30, 1924, thirty-four days after the accident, the patient had an anterior colporhysterotomy (Spinelli operation) performed, under ether anesthesia. The uterus was exposed by the use of a weighted speculum, the edematous endometrium presenting. The cervical ring was grasped on either side of the median line by Jacob's vulsella and brought down into view. The anterior vaginal fornix was incised, the bladder was separated and held upwards by a retractor, the peritoneal cavity was opened, and the inverted funnel was exposed. No adhesions were found. The cervical ring was divided in the median line, and the incision was continued downwards along the anterior wall of the uterine body to the fundus. The uterus was reinverted without any special difficulty. The anterior uterine incision was closed by two layers of interrupted sutures of No. 2, chromic catgut, the first layer deep and the second superficial; the uterine wall was approximated without undue tension. The uterus was then replaced in the abdominal cavity, and free drainage was established by means of T-shaped rubber tubes, the first tube being placed between the uterus and the bladder, and the anterior vaginal incision being closed around it by means of interrupted sutures of No. 2, chromic catgut. A small transverse incision was made in the culdesac of Douglas and the second drainage tube was placed posterior to the uterus. The vagina was lightly packed with iodoform gauze, and the patient was returned to her bed in good condition.

Convalescence.—The patient had considerable postoperative nausea and vomiting, the evening temperature was 102° F., pulse, 118; respirations, 22; she was kept comfortable with small doses of morphia. July 31, there was a slight amount of distention which was relieved by enemata, the postoperative urine examination revealed negative findings; the evening temperature was 102° F., pulse, 120; respirations, 20. August 2, the iodoform wicks were removed from the vagina, the convalescence thus far was satisfactory. August 4, the two drainage tubes were removed. August 9, the patient was given a headrest; she was allowed out of bed on August 11. The discharge examination showed the uterus in mid pelvis, the drainage tracts were healed, and there was no pelvic tenderness. August 16, the patient was discharged well.

Subsequent History.—September 26, examination at the hospital showed the vaginal incisions and the cervix well healed, the uterus was in slight retrocession, the adnexa were normal and the patient had no symptoms. She had not menstruated in August, but had had a period, without pain, from September 1, to September 3.

December 31, the following history was obtained: she menstruated, without pain, in October, from the 20 to the 25; she had no period in November; in December she had a scanty period, without pain, from the 15 to the 18. The examination at this time showed nothing new except that the uterus was in second degree retroversion. The patient felt well and had gained thirty pounds in weight since her operation. On April 8, 1925, she was admitted to the Medical Service of the Carney Hospital; the examination of the lungs and the x-ray findings led to the diagnosis of chronic fibroid phthisis. Her periods had been regular up to the time of her admission. She was given appropriate advice for the treatment of her pulmonary condition and she returned to her home. July 25, 1925, her family physician reported that she was now living in the country; that her tuberculous process was arrested, and that she was gaining in weight.

CONCLUSIONS

1. Puerperal inversion of the uterus is a very rare condition. With constantly improving obstetric practice it will become even less frequent.

2. The predisposing causes are inertia of the uterus, pressure from above, and traction on the cord from below.

3. Shock is the leading symptom, and when this occurs after the third stage of labor, uterine inversion should always be borne in mind.

4. In acute cases the uterus should be reinverted, manually when possible, as soon as the condition is discovered. In cases where this is not possible, laparotomy and reposition by taxis seem to give the best results.

5. Chronic inversion is well treated by the vaginal method; anterior colpohysterotomy (Spinelli operation) when the uterus can be saved, vaginal hysterectomy when the opposite obtains.

6. The shock should be combated by blood transfusion before attempting the operative procedures.

7. The obstetric future of the woman who has had the Spinelli operation should be that of one delivered by a previous classical cesarean section.

REFERENCES

- ¹Campbell, Farquhard: Jour. Am. Med. Assn., 1921, lxxvi, 1396.
- ²Cohen, J. P.: Boston Med. and Surg. Jour., 1922, clxxxvi, 352-357.
- ³Courty, L.: Bull. Soc. d'Obst. et de Gynéc. de Paris, 1925, No. 2, 158-159.
- ⁴Culbertson, Carey: Surg., Gynec. and Obst., 1920, xxx, 315-316.
- ⁵Dantin: Gynec. et Obst., 1922, vi, 310-312. Abs.: Jour. Am. Med. Assn., 1923, lxxx, 435.
- ⁶Day, Hilbert F.: Boston Med. and Surg. Jour., 1912, clxvii, No. 11, 361-364.
- ⁷Evans, E.: Surg., Gynec. and Obst., 1923, xxxvii, 461-465.
- ⁸French, Ralph W.: Jour. Am. Med. Assn., 1923, lxxxi, 1598-1600.
- ⁹Fruhinsolz, A.: Bull. Soc. d'Obst. et de Gynéc. de Paris, 1925, No. 3, 257-258.
- ¹⁰Gaudino, M. T. F.: Semana méd., 1924, ii, 227-230. Abs.: Jour. Med. Assn., 1924, lxxxiii, 1112.

- ¹¹Huntington, J. L.: Boston Med. and Surg. Jour., 1921, clxxxiv, 376.
¹²Jensen, W. W.: Jour. Am. Med. Assn., 1920, lxxv, 310.
¹³Jones, Walter C.: Surg., Gynec. and Obst., 1913, xvi, 632-650.
¹⁴Jones, Walter C.: Am. Jour. Obst., 1914, lxix. (Contains complete bibliography.)
¹⁵Loriente, H.: Rev. méd. d. Uruguay, 1920, xxiii, 371. Abs.: Jour. Am. Med. Assn., 1921, lxxvi, 556.
¹⁶Miginiac, Gabriel: Gynéc. et Obst., Paris, 1923, vii, No. 1, 37-42.
¹⁷Peterson, Reuben: Surg., Gynec. and Obst., 1907, v, 196-213.
¹⁸Thorn, W.: Samml. klin. Vortr., Leipzig, 1911, No. 625 (Gynäk., No. 229), 101.
¹⁹Yates, H. W.: Am. Jour. Obst., December, 1919, lxxx, 712.

395 COMMONWEALTH AVENUE.

(For discussion see page 252.)

FIVE KINDS OF CHRONIC APPENDICITIS*

By ROBERT T. MORRIS, M.D., F.A.C.S., NEW YORK, N. Y.

IT is said that Chinamen all look alike to a man who first visits their country. After a while he learns that there are people of nine different racial types in China, each with its own language.

Almost any topic becomes enlarged and elaborated whenever men examine into its factors. At one time chronic appendicitis was chronic appendicitis to the physician as well as to the surgeon. We may now classify five different kinds of chronic appendicitis, each with a different history and with a separate meaning so far as the diagnostician is concerned. His prognosis in regard to any one of these five kinds would not apply to the other four.

The most frequent kind of chronic appendicitis is that which leads to the largest number of mistakes in prognosis and which furnishes a great group of worthless appendix operations. It is an irritative lesion belonging to normal involution of the appendix. All of the structures of the appendix gradually undergo replacement by connective tissue with the exception of the peritoneal coat, and most important of all, nerve elements. These remain to become pinched and irritated in the course of contraction by the connective tissue. It has been said that fibrosis is not inflammation.

Lord Bacon said, "Show me a man who can define and I will show you a god." Being somewhat modest, I shall not attempt to assume this position and, instead of defining, may at least describe fibrosis of the appendix as a process which incidentally brings about irritation of entrapped nerve elements. Grouped about these will be found new cells belonging to inflammation. This commonest form of chronic appendicitis as a rule does not lead at any time to acute infective appendicitis. It has very different meaning in connection with two separate groups of people.

When this normal involution process takes place in people past middle

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

life there is apt to be disturbance of abdominal sympathetic ganglia including those which conduct digestive processes. Consequently removal of the irritated appendix sometimes gives brilliant results by putting to an end the complications which go with digestion disturbances. It is a different matter altogether when involution of the appendix occurs in young people. It then signifies a stigma of physical decline and it belongs with other stigmata which may be readily discovered on examination. We may find the short sternum with ptosis of abdominal viscera, a loose kidney, narrow costal angle, crowded teeth and one or more of many kinds of stigmata of arrested development. Removal of the appendix in young neurotics before middle life in cases of this sort may be not only worthless but harmful as a surgical procedure. The patient may continue to have the many kinds of physical disturbance which go with the endocrinology of that general physical condition.

The two chief diagnostic signs for fibroid involution of the appendix are so strongly marked that for the most part we need these two only for diagnostic purposes. Pain and tenderness are not at McBurney's point,—at the site of the appendix itself. They have moved over to another point altogether, to the site of the right fused ganglion of the lumbar sympathetic system. Deep pressure a couple of inches to the right of the navel and a little below brings out this hypersensitiveness of the right fused ganglion. I have seen many consultants make pressure over the appendix at McBurney's point and decide that the patient did not have a chronic appendicitis because there was no tenderness on pressure at that point. Tenderness at McBurney's point belongs to acute appendicitis. It is seldom present in chronic appendicitis.

On the other hand tenderness on pressure at this other point near the navel is not present in acute appendicitis. It belongs to chronic appendicitis. Please get that idea firmly fixed in mind for it is highly important.

If we find hypersensitiveness of the left fused ganglion or of other abdominal sympathetic ganglia it throws out our diagnosis of chronic appendicitis which goes with hypersensitiveness of the right fused ganglion only and very distinctly.

The other one of the two important diagnostic signs of chronic appendicitis is what I have called the "cider barrel sign." Percuss the left side of the abdomen and find a normal resonance such as would belong to the cider barrel in October. Now go to the right side of the abdomen; percuss that, and you will bring out a resonance suggestive of the cider barrel in March. What does this mean? It means that the innervation of the cecum and ascending colon have become so wearied with constant nagging from the irritating appendix that their walls remain relaxed and distended allowing the cecum and ascending colon to remain permanently distended with gas.

Having fixed in mind these two signs in the diagnosis of one kind of chronic appendicitis, we may apply them to the four other kinds, for these two signs belong with all kinds of chronic appendicitis apparently. A different set of conditions, however, hangs about each one of the other four kinds.

The next kind of chronic appendicitis in frequency of occurrence is also an irritative lesion. It relates to scar tissue following an attack of acute appendicitis. This scar tissue undergoes the same sort of contraction that it does in the course of normal involution of the appendix, sending an afferent impulse to a segment of the spinal cord and an efferent impulse to various abdominal ganglia with resulting digestive disturbances. Removal of the scar tissue in cases of this sort is frequently justifiable and with results which help to make surgery popular. We have in addition to the two chief signs of "scar" appendicitis the story of the patient relating to an acute attack. When I studied veterinary surgery under Professor James Law he said that it would be a great advantage to me in connection with general medical diagnosis because a cow could never deceive me with her answers to my questions. In these days, however, patients can usually give a fairly accurate account of an attack of acute appendicitis because the subject has been discussed about equally with the Volstead Act.

The third form of chronic appendicitis is really an infective lesion, the first two, which I have previously described, being irritative lesions and not infective. This chronic infective lesion may relate to low grade chronic inflammation of the mucous membrane of the adjacent cecum. It may relate to the presence of entozoa in the appendix. It may relate to low grade inflammation which has remained after one or more acute attacks of appendicitis. The two chief signs are those of chronic appendicitis plus the patient's history of acute attacks. Operation in these cases may be said to be always desirable, although we must be very careful about the use of the word "always."

The fourth form of chronic appendicitis belongs to lymphoid hyperplasia. This again is an irritative lesion. There is an abnormal increase in the lymphoid elements of the appendix and these by causing tension, irritate nerve elements and produce the two signs of chronic appendicitis.

In the first two kinds described, irritation of nerve elements is due to contraction of connective tissue. Here, however, it is quite the reverse and due to expansion of lymphoid tissue. Lymphoid tissue cannot expand within the tight peritoneal sheath of the appendix much more readily than one can open an umbrella before taking off its sheath, hence, an irritative lesion.

The set of conditions hanging about this fourth kind of chronic appendicitis will usually serve to classify it. The patients in general have the so-called lymphoid diathesis. They include the victims of

status lymphaticus and many with a history of hypertrophied tonsils and enlarged lymph glands. Removal of the appendix in these cases will not change the patient's diathesis because that belongs to hereditary entailment. Furthermore, we must always be on guard in these cases against the sudden operative accidents going with cases of status lymphaticus.

The fifth form of chronic appendicitis belongs with chronic congestion in association with chronic congestion of other parts of the bowel and relating largely to blood or lymph circulatory disturbances. The appendix in these cases is not specially congested, and the only reason for its giving out signs appears to depend upon the same mechanical factors as those in the lymphoid appendix. In other words the congested inner structures do not swell readily within the inelastic peritoneal sheath.

It is a question about introducing other defects of the appendix in chronic appendicitis classification. For example, we have recently been informed that as a result of embryonic defect small implants of endometrium may sometimes be found upon the appendix and these would be expected to swell along with swelling of the endometrium at menstrual periods of the patient.*

Shall we include tuberculosis and malignant disease of the appendix under the head of chronic appendicitis? Perhaps it would not be fair to do so, although tuberculosis and malignant disease not infrequently have their origin in the appendix primarily and at the outset may have given the two signs of chronic appendicitis. This is particularly the case with malignant disease. When tuberculosis begins at the appendix it is prone to extend to other parts of the bowel so rapidly that the two chief signs of chronic appendicitis may not appear. I have myself been mistaken and have come across malignant disease of the appendix or tuberculosis of the appendix unexpectedly. As a matter of fact I have made all of the mistakes and have done all of the unnecessary operations which go with worthless appendix surgery, but I hope during the next ten years in practice to do fewer of these than I did in the first ten years of study of the subject.

114 EAST FIFTY-FOURTH STREET.

(*For discussion see page 247.*)

*Sampson, J. A., Archives of Surgery, September, 1922.

APPENDICITIS IN PREGNANCY*

By G. D. ROYSTON, M.D., AND A. O. FISHER, M.D., ST. LOUIS, MO.

(From the Departments of Obstetrics and Surgery, Washington University School of Medicine)

IT is well recognized that appendicitis is a dangerous complication of pregnancy. From available statistics, it appears to be relatively uncommon, being present in about 1 per cent of pregnant women. It has also been estimated that 2.5 per cent of women having appendicitis are pregnant.

Practically all writers agree that the mortality in suppurative cases is high. In more than 600 cases collected from American literature and reported by Weaver, the death rate was about 30 per cent in those operated upon, and 80 per cent in the nonoperated cases. In the non-suppurative cases, the mortality was approximately 1 per cent in those operated upon and 4 per cent in the nonoperated cases. In 40 per cent of this number abortion or death of the fetus occurred.

We have been struck with the rapidity with which the acute cases progress and by the fact that perforation is almost always followed by a diffuse, spreading peritonitis, with little tendency to localization and abscess formation.

In most instances, the diagnosis is not difficult, but the symptoms may be masked by the discomforts which are sometimes present in a stormy pregnancy. In the presence of acute abdominal symptoms suggesting appendicitis, the complication of pregnancy should be disregarded, and early interference is even more urgent, if possible, than in the ordinary case.

In view of these well-established facts, we are strongly of the opinion that appendectomy should be recommended for those who have had attacks of appendicitis and have subsequently become pregnant. Even though they may have successfully passed through one or more attacks, the risk of a recurrence during pregnancy is too great to be disregarded. The operative results in the early months of pregnancy are apparently as good as they are in nonpregnant women and the danger of abortion very slight. In this series there are two such cases in which our advice was followed:

CASE 1.—(Service of Dr. Fisher.) Mrs. S., aged twenty-five, a primigravida, twenty-two weeks' pregnant, entered the Barnes Hospital, September 10, 1924. Her general health had been excellent, but for the past year she had been having abdominal symptoms which dated from an acute attack suffered at that time. There had been one other acute attack subsequently, diagnosed as appendicitis, and during

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

this entire period she had not been entirely free from tenderness. She was seen following the second attack and operation advised. At this time she was pregnant. A third attack a few weeks later hastened her decision and she entered the hospital immediately. She had definite localized tenderness in the lower right abdomen and during a two-hour period of observation, the W.B.C. increased from 11,000 to 14,500. The temperature was 37.6° centigrade. There had been no nausea or vomiting with the present attack. Her pregnancy had been progressing normally. At operation (Dr. Fisher) the uterus reached the level of the umbilicus. The appendix was injected, firmly adherent, and behind the cecum. Its tip was fibrous, the proximal portion distended. It was removed in the routine manner. The adnexa on this side were deeply injected. The wound was closed without drainage.

Aside from considerable nausea and distention, she made an uneventful recovery and had no uterine contractions. She was discharged on the tenth day and subsequent delivery, at term, was normal.

CASE 2.—(Service of Dr. Fisher.) Mrs. O., aged twenty-eight, a primigravida, ten weeks' pregnant, entered Barnes Hospital, June 9, 1924. For several months, she had had pain in the right side, with several rather acute attacks, the last one two weeks before admission. Her temperature and W.B.C. were normal, this being a definite interval. Her pregnancy thus far had been uneventful. At operation (Dr. Fisher) the appendix was large, thickened, kinked at its mid-portion, and adherent to the cecal wall. It was removed in the routine manner. Aside from the pregnant uterus, the findings were negative. The wound was closed without drainage. The postoperative course was uneventful and she left the hospital on the tenth day. Her pregnancy continued normally, and she was delivered at term.

CASE 3.—(Service of Dr. Royston.) Mrs. V. H., aged twenty-six, gravida ii, entered the Jewish Hospital, September 17, 1923. She was three months' pregnant. For the past ten days, she had complained of marked nausea and vomiting and pain in the right lower quadrant. Although she had had a similar attack nine months before, the present trouble was attributed to her pregnancy. Her family and past history were otherwise negative. There had been a slight elevation of temperature four days before admission, but at this time the physical findings were negative, except for slight tenderness on pressure over McBurney's point, without muscle spasm or rigidity. W.B.C. 7,000. Appendectomy was advised and done two days later.

The appendix was definitely involved in a chronic inflammatory process, but without adhesions. The wound was closed without drainage. The patient made an uneventful recovery and was discharged on the fourteenth postoperative day. The abdominal pain was relieved, but the nausea and vomiting persisted for some months longer. She had a normal delivery at term.

CASE 4.—(Service of Dr. Royston.) Mrs. E. H., aged thirty-three, entered St. Luke's Hospital, February 27, 1923, during her third pregnancy, for the treatment of a bilateral pyelitis following a multiple nasal sinusitis. One month before this she had a sudden attack of pain in the back and abdomen with no history of similar previous attack. She was examined with the cystoscope nine times over a period of sixty-five days and the kidney pelvis irrigated. During this period, on April 18, while still in the hospital she complained of sudden acute pain in the lower right abdomen, which radiated into the flank. There was local tenderness and muscle spasm on pressure. Temperature 98.6° F., W.B.C. 7,000. Appendectomy was performed on the same day (Dr. Mudd) and the appendix showed a dilated lumen, with definite evidences of a chronic inflammatory condition. The wall was thickened and the mucosa showed a leucocytic infiltration. She made an uneventful recovery and left the hospital May 6, 1923.

There was no threatened interruption of pregnancy and she was delivered at term.

CASE 5.—(Service of Dr. Royston.) Mrs. G. S., aged twenty-five, a primigravida in the sixth month of pregnancy, entered St. Luke's Hospital on November 20, 1923. Since the onset of pregnancy, she had had several attacks of pain in the lower right abdomen. These attacks were increasing in frequency and severity, but had never confined her to bed. When seen ten days before, at the beginning of her last attack, she had localized tenderness and muscle spasm, but a normal temperature and a W.B.C. of 8,000. On admission the W.B.C. was 11,000 and on the advice of Dr. Tupper appendectomy was done on the following day. The distal half of the appendix was thickened and obstructed and was covered with a Jackson's membrane. The wound was closed without drainage. Five hours after operation, she began having uterine contractions, which were controlled by morphine and ceased after a period of thirty-two hours. Her temperature was normal after the third day, and the convalescence uneventful until the eighth day when vaginal bleeding without contractions appeared. This ceased after two doses of paregoric and she left the hospital on the eighteenth postoperative day. She was delivered on February 12, 1924, labor being complicated by a marginal placenta previa. Mother and child had an uneventful course throughout the puerperium.

CASE 6.—(Service of Dr. Royston.) Mrs. D., aged thirty-three, gravida v, was two months' pregnant when she complained of dull pain in the epigastrium, later in the lower abdomen. The nausea present was attributed to gestation. She gave a history of chronic constipation for years and stated that during the preceding year she had suffered twelve attacks diagnosed as chronic appendicitis. Physical examination at this time revealed neither rigidity nor localized tenderness over the appendiceal region and the symptoms were attributed to a low seated, movable ovary of normal size, though markedly tender.

At the end of the twelfth week of gestation the abdominal discomfort became more severe with localized tenderness on pressure in the right flank. W.B.C. 8,000. Appendectomy (Dr. Link) disclosed a thickened, edematous, subacute appendix with some adhesions present. The wound was closed without drainage. There was no disturbance of pregnancy. Convalescence was uneventful. All abdominal symptoms were relieved.

When near term, the patient complained of dyspnea, cyanosis, edema of all extremities, with a blood pressure of 140/80. Electrocardiogram showed myocardial degeneration. All symptoms were relieved by bed rest and massive doses of digitalis. A normal child was delivered at full term and patient has since felt well.

The six cases outlined above illustrate the chronic or recurrent type of appendicitis, and the operative results should not differ from those obtained in similar cases uncomplicated by pregnancy. The following cases, however, clearly show the dangers of conservatism in acute cases and the necessity of immediate operation.

CASE 7.—(Service of Dr. Fisher.) Mrs. A. M., aged twenty-nine, was admitted to Barnes Hospital, June 27, 1922. She was a primigravida, fifteen weeks' pregnant and entered the hospital as an emergency. Without previous similar trouble, she was taken suddenly ill, about twelve hours before admission, with nausea, vomiting, and acute abdominal pain, first general and later localized in the lower right abdomen. On admission to the hospital she presented the typical picture of acute appendicitis, with a temperature of 38.5° centigrade and a W.B.C. of 20,000. The abdomen was rigid, with acute localized tenderness at McBurney's point.

She was operated upon immediately (Dr. Fisher). There was free fluid in the peritoneal cavity and the cecum was covered with fibrin. The appendix was tremendously distended and completely gangrenous. It was twisted at the base and covered with exudate. There was no apparent effort at walling off and the neighboring intestine was deeply injected. The appendix was easily removed and the

stump buried. The right adnexa were deeply injected. The wound was closed, leaving one cigarette drain. On examination, the appendix was completely necrotic and contained a large fecalith near the base. Her pulse and temperature came down promptly and she made a very satisfactory recovery, with no evidence of uterine irritation. She left the hospital on the tenth postoperative day. Pregnancy progressed normally and she was delivered at term without complications.

CASE 8.—(Service of Dr. Fisher.) Mrs. M., aged twenty-nine, entered Barnes Hospital, April 2, 1925. She was in the sixth month of her third pregnancy, and ten hours before admission, without premonitory symptoms of any kind, was suddenly seized with acute abdominal pain associated with nausea and vomiting. She had never had a similar attack, and owing to its severity, she was brought to the hospital as soon as possible. She was under observation there for two hours. Her temperature was only 37.6° centigrade, but the W.B.C. during this time increased from 14,000 to 22,000 and the abdomen was rigid, with acute localized tenderness in the lower right side. At operation (Dr. Fisher) there was free turbid fluid in the peritoneal cavity. The appendix lay to the inner side of the cecum. It was acutely inflamed, greatly distended, and covered with fibrin. The distal portion was gangrenous. Again, there was no effort at localization. It was removed and the stump buried. The pelvic organs were markedly congested on the right side. The wound was closed leaving two cigarette drains. The convalescence was complicated for a few days by uterine contraction, abdominal distention, and acidosis. Intravenous glucose cleared up the acidosis and small doses of morphine controlled the uterine contractions. Following this she made a rapid and satisfactory recovery, her wound healed nicely and she left the hospital on the sixteenth postoperative day. Delivery at term was uncomplicated.

CASE 9.—(Service of Dr. Royston.) Mrs. F. F., aged nineteen, entered St. Luke's Hospital, March 31, 1923. She was a primigravida, six months' pregnant and a few hours previously had suffered an attack of generalized abdominal pain. About seven months previously, she had a transitory attack of lower right abdominal pain, which cleared up promptly and did not suggest appendicitis. Two days before admission, she was taken ill with diarrhea, but had no nausea, fever, or leucocytosis. The following day she complained of generalized abdominal pain which became more severe and localized in the right lower abdomen. Her temperature was normal, but her pulse rose to 120. An emergency appendectomy was performed a few hours later by Dr. Seelig, who found free pus in the peritoneal cavity and a gangrenous appendix. There had apparently been no effort at walling off. The appendix was removed and the wound closed with drainage. The postoperative course was stormy, with numerous complications which finally resulted in her death. During the first few days, premature labor was threatened, but the uterine contractions were controlled by morphine. There was a persistent acidosis which was difficult to control and a pyelitis developed on the thirteenth day with a considerable temperature elevation. This did not clear up in spite of lavage of the kidney pelvis, and the patient finally presented the picture of a generalized infection. She went into premature labor on the forty-seventh postoperative day. The child of thirty-one weeks' gestation died in a few hours. The mother died of acute pulmonary edema the following day.

This case was unusual in that she apparently recovered from the appendicitis and peritonitis and withstood the operation, until other complications arose which caused expulsion of the fetus and her own death seven weeks later.

CASE 10.—(Service of Dr. Royston.) Mrs. J. G., aged twenty-two, primigravida, five months' pregnant, entered St. Luke's Hospital, February 26, 1923. She had been ill for five days previously with pain in the right upper abdomen which was attributed to the right kidney. The latter was palpable and tender and the urine contained many leucocytes and motile bacilli. During this period the temperature

and pulse were normal. The day of admission there had been an acute exacerbation of abdominal pain without nausea or vomiting, but it gradually became localized in the lower right abdomen, with definite muscle spasm. On admission the temperature was 103.4° F., pulse 130, and W.B.C. 11,000. There had been no previous similar attacks. She was operated on at once by Dr. Tupper who found pus in the peritoneal cavity with a gangrenous appendix and no evidence of any attempt at localization. The appendix was rapidly removed, without inversion of the stump and the wound closed with drainage. Severe uterine contractions began eight hours after operation which could not be controlled, and she was delivered of a five months' fetus one hour later. She did badly following this. Distention was marked and persistent. Temperature and pulse were elevated, and on the fifth day blood cultures showed the presence of hemolytic streptococcus. She died on the sixth postoperative day. Of these four acute cases, the first two were fortunately seen very early and although the appendix in each case had become gangrenous within the first few hours, there was no extensive peritonitis and they survived operation without aborting. In the other two cases, there had been symptoms which did not seem to warrant a diagnosis of appendicitis and they were not operated upon until a general peritonitis had developed. Probably the appendix was the cause of the original trouble and we are convinced that it is extremely dangerous to wait for more definite symptoms to develop, if the appendix is under suspicion at all. In comparison, the risk of early operation is almost negligible.

These four cases all illustrate again the usual failure of these infections to localize and the rapidity with which they spread. We feel that the most reliable symptom is localized pain and tenderness over the region of the appendix, while fever, leucocytosis, nausea, and vomiting are frequently absent in the early cases and appear only after the infection has begun to spread. Valuable time may be wasted in efforts at making a differential diagnosis. The increased vascularity and lymphatic dilatation are probably factors in predisposing to a generalized rather than a localized infection. When abortion occurs in the presence of infection, the raw uterine cavity and its gaping thrombosed vessels add tremendously to the dangers of spreading infection. After appendectomy, morphine is indicated to arrest threatened abortion. In order to avoid any weakening of the abdominal wall, we recommend opening the abdominal cavity through an incision which does not split or tear the rectus muscle, if possible. Any undue trauma to the wound or exploration of the abdominal cavity is particularly contraindicated. Simple drainage is much safer than a prolonged effort to find or deliver a difficult appendix.

In closing, let us emphasize the importance of early diagnosis excluding urinary tract infection, gaseous distention of the intestines, and various pelvic conditions, such as tender adnexa, which is probably not as frequent as generally thought, varicosities of the broad ligament, displacement of the adnexa, and the rather remote probability of gall bladder or duct disease; but the warning should be sounded that too much valuable time should not be consumed in a laborious scheme of differential diagnosis—if the appendix is suspected, operate.

WALL BUILDING.

HUMBOLT BUILDING.

(For discussion see page 247.)

PROLAPSE OF THE PLACENTA*

By M. PIERCE RUCKER, M.D., RICHMOND, VA.

I WISH to report an unusual case from the out-patient service of the Medical College of Virginia. The patient was a negro woman, twenty-eight years old, who had been delivered by a midwife seven times, without complications. There had been no abortions. The present pregnancy had been apparently normal. There had been no prenatal care. On June 28, 1920, she was returning home about 8 P.M. with a basket of clothes on her head. She suddenly felt faint and began to bleed. After she rested on the curbing for a while the faintness passed off. She then walked home, a distance of one-half mile, without difficulty. After getting home she began to have pains and the bleeding commenced again and continued until the placenta was expelled at 3 A.M. It was at this time that a call was sent into the Memorial Hospital. She was found in a pool of clotted blood, but she was no longer bleeding. The uterus was rigid and reached 2 cm. above the navel. The midwife exhibited the placenta in a basin. It was devoid of membranes except at one edge where there was a little tag about 3 by 7 cm. The midwife had severed the cord a few inches from the placenta. The attachment of the cord was eccentric. The fetal surface of the placenta was smooth and glistening, and there were no torn blood vessels. The maternal surface was apparently intact. It was somewhat lobulated. There was an oval area about one-fourth the total area of the placenta extending to the periphery, that was distinctly darker and firmer than the rest of the organ.

Shortly after our arrival, the mother began to have severe bearing-down pains almost continuously. The head was born at 3:50 A.M. Restitution was to the right. There was no laceration, and no anesthetic. The fetus, a female, was rigid with rigor mortis. It weighed 3175 gm. Ossification was complete. Nothing unusual was found at autopsy.

The mother had a normal afebrile puerperium except that involution was somewhat delayed. On the tenth day the fundus was still five fingers breadth above the symphysis.

The first case of this kind was reported by Loss, in 1672. A curious case is reported by Perfect to have occurred in 1766, in which a midwife found the placenta in the mouth of the womb and pulled it away, thereby breaking the navel string. A man-midwife was sent for who delivered a live baby by turning. Ross, in 1799, described a mar-

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

ginal placenta previa where more and more of the placenta became detached, and where the placenta was expelled through the os externum four hours before the birth of the child. Osiander reported three cases in 1832, two at seven months of uterogestation and one at four months. He gave the name *prolapsus placentae* to the condition, and was of the opinion that a placenta previa was a necessary antecedent to it. This view was generally held until the autopsy in Scanzoni's case showed that there had been a normal implantation of the placenta. Since then a number of prolapses of normally implanted placentae have been reported, most of which have occurred in twin pregnancies, preceding the birth of the second twin. Münchmeyer reported two cases of prolapse of a normally implanted placenta, one of which was a twin pregnancy, and the other in a woman with a well-marked flat, contracted pelvis. Larisch has recently reported a prolapse of a normally implanted placenta associated with hydramnion and transverse presentation. There seems to be a tendency in the modern textbooks to limit the term prolapse of the placenta to those cases in which the placenta has been normally implanted. Both Williams and DeLee take this view. This is justifiable neither etymologically nor historically. A placenta has as much right to fall out of the womb when it is situated on the lower uterine segment as when it is situated normally. Furthermore, it is quite certain that when Osiander used the term *prolapsus placentae* he had in mind placenta previa and thought that the prolapse could occur only when the placenta was in front of the fetus.

Frequency.—If the term be restricted to the normally implanted placentae the condition is exceedingly rare. Larisch says there has been no cases in the Breslau clinic in twenty years. Prolapse of placenta previa is not so uncommon. F. H. Ramsbotham cites a number of men who had seen several cases. L. Müller in his book on placenta previa was able to find this complication reported in sixty cases. Simpson in his memoir reported a total of 141 cases. Fifty-six of these were on record and the remainder were from notes furnished by colleagues.

Etiology.—The accident occurs in multipara in the large majority of cases. Among the sixty cases that Müller collected there was only one primipara. It is very prone to occur in premature labors as might be expected from its relationship to placenta previa. Osiander, Scanzoni, and Hohl noted it only in premature births. In 89 of Simpson's cases where these data are given, three occurred before the sixth month, five in the sixth month, nineteen in the seventh month, nineteen in the eighth month, and forty-three in the ninth month. The presentations as noted in ninety cases by Simpson were as follows: head fifty-nine, trunk or upper extremity twenty-one, breech six, and feet four times.

The first step in the prolapse of the placenta is, of course, the detachment. When there is a central placenta previa the detachment may happen as the cervix dilates. The mass then falls into the vagina or is

forced there by the pressure of the amniotic fluid. Hüter was of the opinion that standing and walking during labor pains favored a prolapse of the placenta. L. Müller thought that the presenting part could push the placenta loose from its attachment and out into the vagina. When the placenta is marginal the detachment of the placenta can be caused either mechanically by the uterine contractions, or by changes in the placenta itself. Prolapse of such a placenta may be prevented by pressure of the presenting part. If, however, as in Ross' case the head remains high or if there is a malposition there is nothing to prevent the prolapse of such a placenta.

In the cases of normally implanted placentae, the cause of the detachment is obscure. Toxemia has not been a prominent feature of the cases that have been reported, nor do the patients have the shock, and other symptoms we are accustomed to see ordinarily in cases of *ablatio placentae*. Lange, Spiegelberg and Schröder called attention to the fact that most of the prolapsed placentas occur in twin pregnancies, after the birth of the first child. It is possible that a sudden shrinking of the area of the inner surface of the uterus might cause the separation of the placenta. The escape of the great excess of amniotic fluid in Larisch's case might have played a similar rôle. The prolapse of the placenta, once it becomes detached, would be possible in twin pregnancies as cited by Lange, Spiegelberg, and Schröder, when the second twin does not quickly occupy the pelvic inlet. In Münchmeyer's first case the prolapse was possible because the large fetal head did not engage in the flattened pelvis. In Larisch's case the transverse position of the child allowed the placenta to prolapse.

Symptoms.—Hemorrhage is the outstanding symptom, in fact the only symptom, in these cases. It is usually the first symptom in the *previa* cases. When the placenta is located in the body of the uterus, the hemorrhage may not occur until after the labor is well advanced. In Larisch's case it did not occur until after the bag of waters broke. It may even be absent altogether. In neither of Münchmeyer's cases was there any bleeding before delivery and only the usual loss of blood afterwards. Simpson emphasized the fact that the hemorrhage ceased when the placenta was entirely detached. He was so impressed with this that he advocated the artificial extraction of the placenta in certain cases of *placenta previa* and actually practiced this method of stopping the hemorrhage in at least one case.

The diagnosis rests upon finding the placenta either in the vagina or entirely outside the body. The accident should be suspected in twin pregnancies when the fetal heart tones of the undelivered child are no longer heard. The only problem in diagnosis that prolapse of the placenta presents is the question of the location of the placenta. Larisch's reasons for believing that the placenta in his case was normally implanted covers the chief points in differentiation. They are (1) no

placenta found upon vaginal examination, (2) no bleeding before labor was well advanced, (3) free blood above the child, (4) the opening in the membranes was some distance from the placenta, and (5) no trauma to the placenta.

Prognosis.—The prognosis for the mother is not particularly bad. In fact the prolapse of the placenta seems to be of some benefit to the mother. In Simpson's time when about one out of every three mothers with placenta previa died, only one in fifteen with prolapsus placentae died, and of the eight deaths in his series only two died of hemorrhage. Of thirty-four mothers in Müller's series, only two died. The outlook for the baby is entirely different. In the first place the majority are premature and some even are of nonviable age. In the second place, delivery must quickly follow the separation of the placenta. Grenser puts ten minutes as the outside limit. The only hope then for the infant even if he be mature, lies in prompt delivery. In Nadler's case, he had begun to turn the baby on account of a placenta previa, when the placenta prolapsed, and fell over his forearm. An extraction was promptly done and the baby survived. In most cases the fate of the infant hangs on the promptness of his spontaneous delivery. Scanzoni knew of no case with a living child. In twenty-six of Müller's cases only six were living shortly after birth. Data concerning the infants were given in one hundred and thirteen of Simpson's cases, and of these thirty-three infants were born alive. It should be remembered that both Simpson's and Müller's cases were collected before the time of asepsis and in the early days of anesthesia. Furthermore only one-fourth of the maternal deaths in Simpson's cases were due to hemorrhage. The prognosis for the mother under modern conditions should be considerably better. Whether it proves to be so or not the number of modern cases is too small to determine. There were no maternal deaths in the five cases reported by Münchmeyer, Nadler, Larisch and myself. As to the improvement to be looked for in fetal death rate, it must be remembered that the great majority of these cases occur as a complication of placenta previa. With modern treatment of placenta previa this complication should not occur or if it does, only in the course of delivery. The fetal mortality, therefore, should be that of placenta previa. In the small group of prolapses of normally implanted placentae, the only improvement from the standpoint of the infant, that might be expected, would come from a more careful watching of twin pregnancies. In the five cases just cited only one baby was saved (Nadler's).

CONCLUSION

Prolapse of the placenta is usually a complication of placenta previa. It may, however, occur in exceptional cases, such as twins, malpositions, and disproportion between head and pelvis, when the placenta is normally situated.

The only symptom is antepartum hemorrhage. The diagnosis is made by finding the placenta of the undelivered child outside of the uterus.

The prognosis for the mother is not bad. On the other hand, it is exceptional that the baby is born alive.

REFERENCES

- Barlow, James: *Essays on Surgery and Midwifery; with Practical Observations and Select Cases*, London, 1822, Baldwin, Cradock, and Joy, p. 273.
- Baudelocque, Jean Louis: *A System of Midwifery* (transl. from the French by John Heath), London, J. Parkinson and J. Murray, 1790, ii, 37.
- Collins, Robert: *A Practical Treatise on Midwifery*, Philadelphia, Haswell, Barrington and Haswell, 1838, p. 51.
- Comin, A.: *Ann. Soc. Méd. chir. de Bruges*, Sept., 1862, 2 sér. x., p. 275.
- DeLee, Joseph B.: *The Principles and Practice of Obstetrics*, Philadelphia and London, 1913, W. B. Saunders Company, p. 439.
- Golding, J. P.: *Dublin Jour. Med. Sc.*, July, 1873, lvi, 87.
- Gowers: *Lancet*, London, 1831, i, 119.
- Grenser, Woldemar Ludovicus: *Naegeles, Lehrbuch der Geburtshülfe*. Mainz, 1869, V. von Zabern, ed. 7, p. 730.
- Hamilton, Alexander: *A Treatise on Midwifery*, Edinburgh, Dickson, 1781, p. 273.
- Hecker: *Bayr. Intell.-Bl.*, 1871, p. 181.
- Henning: *Arch. f. Gynäk.*, 1875, viii, 337.
- Hohl, Antonius Fridericus: *Lehrbuch der Geburtshülfe*, Leipzig, 1862, W. Engelmann, ed. 2, p. 686.
- Hüter, C. Ch.: *Deutsch. Klinik*, 1852, iv, 557.
- James, Walter: *London Med. Repor. and Rev.*, May, 1828, New Series, vi, 411.
- De La Motte, Guillaume-Manquest: *Traite complet des accouchemens*, new ed., Paris, 1765, L. C. D'Houry. Obs. 321, 322, 323. ii, 940.
- Lange, Wilhelm: *Lehrbuch der Geburtshülfe*, Erlangen, F. Enke, 1868, p. 810.
- Larisch: *Monatschr. f. Geburtsh. u. Gynäk.*, 1924, lxvii, 278.
- Lathrop, William H.: *Med. Rec. N. Y.*, 1885, xxviii, 540.
- Lee, Robert: *Med. Gaz.*, 1839, xxiv, 554.
- Loss, Fredericus: *Observationum medicinalium libri quatuor*, London, 1672, E. Flesher, obs. xxiv.
- Mende, L.: *Beob. u. Bemerk. a. u. Geb. u. gerichtl. Med.*, Göttingen, 1826, iii, 296.
- Müller, Ludwig: *Placenta Praevia*, Stuttgart, F. Enke, 1877, p. 209.
- Müller, P.: *Würzb. med. Ztschr.*, 1866, vii, 34.
- Münchmeyer, F.: *Arch. f. Gynäk.*, 1888, xxxiii, 486.
- Nadler, Jakob: *Schweiz med. Wchenschr.*, 1921, li, 854.
- Osiander, Joh. Fridrich: *Gemeinsame deutsche. Ztschr. f. Geburtsh.*, 1832, vii, 223.
- Perfett, William: *Cases in Midwifery, with References, Quotations and Remarks*, Rochester, T. Fisher, 1783, ii, 288.
- Ramsbotham, Francis H.: *The Process of Parturition*. First American ed., revised, Philadelphia, 1842, Lea and Blanchard, p. 340.
- Ramsbotham, John: *Practical Observations in Midwifery; with a Selection of Cases*, London, 1832, S. Highly, Cases 153, 154, 155, Part 2, p. 229 to 236.
- Ross: *Ann. Med. Edinboro*, 1799, iii, 308.
- Schröder, Carl Ludwig Ernst: *Lehrbuch der Geburtshülfe*, Bonn, 1888, M. Cohen u. Sohn, ed. 10. p. 702.
- V. Scanzoni, Friedrich: *Lehrbuch der Geburtshülfe*, Wien, 1867, ed. 4, p. 566.
- Siebold, Ed.: *Vorfall der Nachgebur.* *Monatschr. f. Geburtsh.*, 1855, vi, 258.
- Simpson, James Y.: *Month. Jour. Med. Sc.*, 1845, v, 158; *ibid.* 169.
- Smellie, William: *A Collection of Cases and Observations in Midwifery*, London, 1754, D. Wilson and T. Durham, ii, 310.
- Spiegelberg, Otto: *Lehrbuch der Geburtshülfe*, Lahr, 1882, M. Schanenburg, ed. 2, p. 373.
- Williams, J. Whitridge: *Obstetrics*, New York and London, 1903, D. Appleton and Company, p. 715.

(For discussion see page 252.)

TREATMENT OF PLACENTA PREVIA BASED ON A STUDY OF 303 CONSECUTIVE CASES AT THE BOSTON LYING-IN HOSPITAL*

BY FOSTER S. KELLOGG, M.D., BOSTON, MASS.
(*Instructor in Obstetrics, Harvard Medical School*)

IN 1921 I reported a reduction in maternal mortality in placenta previa at the Boston Lying-In Hospital for the years 1915-1920 over previous years. This improvement was from 19 per cent, in 1895-1915, to 6 per cent, in 1915-1920, and was attributed to marked increase in treatment by conservative methods, the use of the Voorhees' bag and bipolar version, as against manual dilatation and immediate extraction. Other factors were contributory but this was the main one. Reference to the first five columns of Table I shows this graphically.

It will be observed that when conservative methods reached 57 per cent the mortality had dropped to 6 per cent. In concluding this report I predicted confidently that in the next five years when we should have treated 70 to 75 per cent of the cases (which seemed as high as possible in hospital practice) by conservative delivery from below, our results would be still better, and perhaps equal the German statistics of 3 per cent. I stressed our series of 12 complete and 43 incomplete previas delivered with bags or bipolar version without maternal mortality as a basis for this belief.

TABLE I

	PLACENTA PREVIA 303 CASES, MATERNAL MORTALITY 15%					
	ACCOUCHEMENT FORCÉ 152 CASES, MATERNAL MORTALITY 19%				BAG AND BIPOLAR VERSION, 151 CASES, MATERNAL MORTALITY 8.25%	
	'95-'00	'00-'05	'05-'10	'10-'15	'15-'20	'20-'25 + six months
Number of Cases	18	26	42	66	66	85
Maternal Mortality	17%	15%	24%	20%	6%	10.5%
% Cases Bag or Bipolar Version	0	0	2%	13%	57%	76 %
Number Maternal Deaths	3	4	14	13	4	9
Maternal Mortality Complete Previa				36%	18%	25 %
Maternal Mortality Incomplete Previa				9%	0%	6 %
Fetal Mortality				44%	48%	54 %

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

The next five year period ended and was studied. I hoped to demonstrate conclusively that conservative delivery from below is the best method of treating placenta previa. I expected to do a bit toward checking the growing tendency to resort to abdominal section in these cases. It had always seemed the mark of a nonobstetrical surgeon to resort to section except in the very rare primiparous central previas. Reference to the sixth column of Table I shows that expectations were not realized. True, 76 per cent of our previas had been delivered conservatively from below, but our maternal mortality had risen from 6 per cent to 10.5 per cent. In complete previas it had risen from 18 per cent to 25 per cent. The fetal mortality had risen somewhat. The combined mortality in 151 cases by conservative treatment was 8.25 per cent as against 19 per cent in 152 cases delivered by radical manual dilatation and immediate extraction. The only honest conclusion I could draw was that conservative delivery from below is more than twice as safe for the mother as accouchement forcé in placenta previa.

That conservative methods from below are obtaining best results in this condition is not so certain.

A study of the literature makes it possible to state that we do not know what the mortality is in placenta previa treated by abdominal section. This in regard to all previas to say nothing of the mortality in the different groups dependent on the degree of previa. It has been stated as 2 per cent, again as 3.6 per cent, again as 5 per cent by German authorities; as 4 per cent by an American, and by others as much higher. Because of the relatively few cases we must feel that these are but estimates.

Hitschmann, who gives the cesarean mortality as 3.6 per cent, states that in general, delivery by bipolar version or bags has a death rate of 7.6 per cent.

I would call to your attention eight considerations bearing on treatment which have arisen as a result of this study. These are:

(1) The "Typical Placenta Previa Death." Briefly described it is as follows: Delivery is accomplished, the placenta out, ergot and pituitrin given, fundus held, cervix pulled down with hooks, inspected, found intact or laceration repaired to top, fundus, cervix and vagina packed or not as you choose, transfusion or not as indicated, patient in fair or good shape, prognosis good barring sepsis. One-half to three hours later bleeding, rising pulse or lower pressure, softening fundus; re-examine, intact cervical ring, pack or repack, ergot and pituitrin, transfuse or retransfuse—consider hysterectomy, condition too poor, sudden persistent softening of whole uterus, death. Not all previas die in this manner, but this happens often enough to keep up the mortality and discourage one with delivery from below. For many years I have sought a satisfactory explanation of this phenomenon without success, because it seemed to me that if we could eliminate cases dying in this

manner our mortality would be only the inevitable one due to neglect and occasional surgical accident. The usual explanation given is atony of the isthmus. For instance, R. T. von Jaschke says, "Half the deaths in placenta previa are due to the bleeding produced by the dilatation of the lower uterine segment during the third stage and immediately after." Hofmeier on the other hand denies this explanation and states that "there is little danger of hemorrhage resulting from the lack of contraction of the lower uterine segment." This divergence of opinion by authorities, together with the observation that the bleeding usually manifests itself after some interval, justifies my scepticism of this "atony of the isthmus" explanation of the "typical placenta previa death." Only this year have I had a satisfactory explanation. Dr. F. S. Newell, of Boston (with whose permission I quote this conversation), said that in talking with Dr. Wm. E. Caldwell, of New York, Dr. Caldwell told him that at autopsy he had observed the following pathology in certain patients dead with placenta previa: an intact or well-repaired external cervical ring, but above in the lower uterine segment a split at the placental site into the uterine musculature, permitting hemorrhage from large deep vessels and sinuses. I think this observation of paramount importance in a consideration of the treatment of placenta previa. It explains the interval before the appearance of bleeding noted above in the description of the "typical placenta previa death." As the uterus in its normal postdelivery contraction and relaxation, more pronounced in multiparous women as are most previas, contracts, the bleeding is checked; when it relaxes, bleeding occurs freely. It explains the observation that whereas transfusion before, during, and after delivery in some cases is as helpful as most writers state, in this group it seems to hasten the end; as blood is pumped into the arm and, keeping up pressure, runs out of the uterus. It explains why the pack does not control bleeding. As the pack is introduced, the uterus contracts and the bleeding stops; when the uterus relaxes, the pack is not against the deep, partially buried bleeding vessel.

(2) A second matter for your consideration is suggested by the following statement from Hofmeier. It is his opinion that in placenta previa the lower uterine segment is not the primary seat of implantation of the ovum, but that the presence of a portion of the placenta near the cervix is due to the widespread growth of the placenta or to a placenta reflexa. Because of this and because of the anatomic arrangement of the blood vessels there is no serious blood loss after delivery, even when there is no active contraction of the lower uterine segment. He continues, and this is the sentence I wish particularly to emphasize—"Only where the placenta has grown into the uterine wall is there danger of hemorrhage. In the latter case a Porro operation is indicated." To interpret this in another form he believes that it is only when pla-

centa previa and placenta accreta (or increta) coexist that danger from the lower segment arises. But he fails to state and I fail to see how this can be predetermined. Coupled with this statement is my own opinion based on observation in the case room. I feel that there are a certain number of previas in which no method of delivery from below, either natural or artificial, will fail to rupture the lower segment in one way or another, open or concealed. In this group I believe a part of the lower segment is so invaded by placental tissue or so thinned out that it cannot fail to rupture if the fetal head comes through it. I believe, but do not know, both on theoretical grounds and by a very few observations that this is as likely to be true in partial as in complete previa. I believe that in marginal previa the statement above by Hofmeier regarding higher primary implantation is always true.

(3) The third consideration involves a critical discussion of the theory of bipolar version and the use of the Voorhees' bag in the treatment of placenta previa. We, as advocates of these methods of treatment, have insisted in our teaching that the *sine qua non* in the treatment of placenta previa is to obtain full dilatation without violence, or manual dilatation,—synonymous terms. We have insisted that bad results come because the attendant would not wait for the bag to dilate completely, or would insist on pulling the baby, gently of course, through the partially dilated cervix rather than wait for nature to push it through as the true Braxton Hicks' procedure calls for. One of my associates in the hospital who has an enviable series of successful deliveries by these methods still insists that this is true. Two years ago I agreed; now I doubt whether it is always true, though I still believe it too often is. These things make me question: (a) that in my previous paper I seemed to demonstrate that the danger of rupture lies in the last inch of dilatation rather than in the earlier part. In other words that rupture is caused by the after-coming head and not by the dilating instrument whether it be bag, breech, or fist. (b) That in bipolar version the dilatation obtained by the breech by nature, especially in premature babies who have a relatively smaller breech, is often not enough for the head, and when the head sticks and is picked out "ever so gently" rupture may take place. (c) That bag failure; i.e., failure of the bag to obtain full dilatation, does take place to the extent that nearly 50 per cent of the last five years' cases in this series are recorded as having a rim of cervix visible when the bag came out and labor stopped or bleeding occurred forcing immediate delivery by manual dilatation of the rim and "gentle version and extraction." The average fist never dilates the cervix completely, therefore, precisely the same condition as in (b) resulted with its inevitable toll of rupture from the dangerous last inch. That this bag failure occurs frequently is further emphasized by W. B. Thompson, reporting 66 cases of placenta previa in the first 10,000 deliveries at the Johns Hopkins

Hospital, who states without apology: "The use of the bag is routine at the Johns Hopkins Hospital. Because of the poor quality of the Voorhees' bag one seldom gets complete dilatation. When the bag is expelled therefore, the physician should finish dilatation manually and do a version and extraction or forceps, etc."

TABLE II
CAUSES OF MATERNAL DEATHS

Hemorrhage and Shock -----	15
Hemorrhage and Shock, probably ruptured uterus----	15
Undoubted Ruptured Uterus-----	6
Septicemia and Peritonitis -----	5
Pulmonary Embolus-----	3
Miscellaneous -----	3
<hr/>	
Total Deaths in 303 Cases of Placenta Previa -----	47

(4) I would call to your attention Table II, which lists the causes of death in the 47 previas that died in this series of 303 cases. Unfortunately few autopsies were obtained; the causes of death as given, represent my interpretation of the records. You will first note without the burden of percentages that practically half probably died of ruptured lower segment, concealed or open. Then you will note that if the bulk had not died of hemorrhage or ruptured uterus or both, that on the law of averages four or five more would have died of sepsis in one form or another.

(5) Table I shows the maternal mortality rate in our complete previas. For fifteen years, by five year periods, it has run 36 per cent, 18 per cent, 25 per cent,—the last two figures under the most conservative treatment from below. I am open-minded about these figures and only ask, could they possibly be worse under any other method of treatment?

(6) Infant mortality. I have taught for many years that the baby in toxemia with convulsions and in placenta previa is a by-product. If you save it, so much the better; if you do not and save the mother, you should be satisfied. That no consideration for the baby should alter the treatment against the mother in conditions in which there is so high a fetal mortality in the nature of the disease, has been insisted upon. I still believe this in principle but I am questioning whether in placenta previa, by sacrificing the baby we are so often saving the mother per se. An analysis of fetal deaths in these five and one-half years, with its 25 per cent complete and its 10.5 per cent general previa mortality leads me to question this. Briefly this analysis shows that in 85 cases 46 infants died or were born dead, a fetal mortality rate of 54 per cent. Twenty of these 46 dead infants either had no fetal heart sounds or weighed four pounds or less. In 3, the weight was not stated. Twenty-

three, or 50 per cent of the dead infants, had fetal heart sounds and weighed more than four pounds (many six pounds or more) at still-birth. We lost 27 per cent of the babies of the 85 mothers either for nothing or to save more mothers,—according to the point of view. Of 85 babies, 23 died who might have lived if they had not been subjected to delivery from below. Again I only question whether our maternal mortality justifies this.

(7) A seventh consideration is a minor one,—yet I have seen it contribute to fatal outcome. The multiparous women in whom placenta previa is most frequent are prone to vulval and vaginal varicosities. It is disconcerting to observe the difficulty of controlling bleeding from these if extensively ruptured by the head,—while a torn cervix bleeds simultaneously.

(8) Barring Germany, where very low maternal mortality is reported from bipolar version, and where, oddly enough in the face of this, there is the most enthusiasm for section in the treatment of previa, these statistics compare favorably with others or are much the same in similar institutions. To illustrate with but one example in a reasonably long series of cases; New York Lying-In Hospital, 591 cases, maternal mortality 12.1 per cent, stillbirth incidence 42 per cent. Treatment chiefly gauze packing followed by internal podalic version (R. McPherson). Kosmak reports from the same institution another series with 14 per cent maternal mortality, stillbirth rate 62 per cent.

To recapitulate these eight points before drawing conclusions:

(1) The “typical placenta previa death” with its apparent explanation by Dr. Caldwell’s autopsy observations on “concealed rupture,” can only be prevented surely by delivery from above.

(2) Hofmeier’s recognition that placenta previa and placenta increta occur together and the danger in this, together with my own clinical opinion that some placenta previa cervixes are bound to rupture if a baby passes through. Neither of these conditions can be predicted in advance and can only be determined and appropriately treated from above.

(3) Bipolar version and Voorhees’ bag induction often do not obtain full dilatation which is the desired object in conservative delivery from below; in the last inch of dilatation lies the danger of rupture.

(4) The maternal death rate is due in half the cases to rupture of the uterus, the others are nearly all due to hemorrhage and shock (so-called but practically just hemorrhage) and sepsis. It would seem that hemorrhage could be controlled as surely by delivery from above with hysterectomy if necessary, as any other way. If bleeding occurs later the uterus could be packed. We should remember in this connection that according to one theory there is no danger of bleeding from the lower segment, ordinarily (Hofmeier), and according to another, this tendency to bleed is “produced by the dilatation of the lower uterine

segment during the third stage and immediately after" (von Jaschke). In either case, therefore, we should seldom have hemorrhage in delivery from above. It would seem that sepsis is best prevented by delivery from above and hysterectomy when the history of the case makes infection probable, especially when we remember the cardinal pathology of practically all lethal sepsis—a focus of infection in the torn cervix. It would seem that ruptured uterus, open or concealed, accounts for half the deaths, and I suspect rather more can be surely prevented by delivery from above.

(5) Maternal mortality in complete previa by any method from below is so high that some other method deserves extended trial.

(6) A very high proportion of living (not too premature) babies are lost by delivery from below. Many of these would be saved by abdominal section.

(7) Ruptured varicosities sometimes contribute to a fatal result. These would not be ruptured by section.

(8) These reported results are as good as average and better than many.

CONCLUSION

In spite of previously held opinions, and in the face of the opinions now held by those for whose obstetrical judgment I have the most regard I am forced by this study to these beliefs:

That all central and partial previas are best treated by low abdominal cesarean section, whether the baby be viable or nonviable, living or dead.

That marginal placenta previa is best treated by Voorhees' bag induction.

That moribund or very sick patients with placenta previa should be rested, bleeding controlled by necessary methods, including tight cervical and vaginal pack and pressure over and above the fundus; transfused, operated as above on pulse and pulse pressure reaction, and retransfused. It should always be the effort to ascertain as nearly as possible how much blood has been lost and to replace that amount as nearly as possible. I think direct transfusion probably better than citrated blood if time, apparatus, and knowledge of technic permit. If there is any question of these things, the simple citrate transfusion should be used immediately, since unquestionably a quick, well-done citrate transfusion is superior to a botched direct transfusion.

Further, I believe that hysterectomy following section should be frequently practiced, each case to be considered by itself on the following grounds: risk of sepsis from previous history, persistent bleeding following the section, and number of dependent children at home. If a woman has several as is usually the case, and hysterectomy seems to improve her chances, it should unhesitatingly be done.

INDICATIONS FOR CESAREAN SECTION^{*}

BY BUDD VAN SWERINGEN, M.D., FORT WAYNE, IND.

IT is not the purpose of this paper to treat of those indications for cesarean section which have long been recognized by all of the profession as sufficient or absolute. The rachitic pelvis with a very short conjugate, a marked justo-minor pelvis, or, as in one of my early cases, an interischial diameter of 2.25 inches, as well as some other deformities, render the delivery of a live baby by the vaginal route an impossibility.

It is very easy in the seclusion of one's own study, to lay down hard and fast rules for this operation but when one is confronted by a specific case it is not always so easy to decide that section is, or is not, the best method of treatment even in contracted pelves where the measurements can be accurately obtained, for we still have the size of the child's head to reckon with as well as its probable compressibility. Where there is reason to suspect an unusually large fetal head the upper limit according to Williams, which is 8.5 cm. in flat and 9 cm. in generally contracted pelves, will have to be increased if one is desirous of delivering a live baby which has not been so badly hurt that it perishes after a few hours or days.

That treatment must be considered the best which results in an uninjured living child and a living mother who has sustained the minimum amount of trauma, without sacrificing her prospects for future deliveries, unless such are manifestly impossible.

In passing judgment on the treatment of a certain case one should not be too hasty to condemn a method selected without taking all the factors entering into the selection into consideration. For instance, in consultation with a physician of great experience, I elected to do a cesarean section in a brow presentation in a primipara, thirty-five years of age, at term. Potter would doubtless have delivered the baby by podalic version successfully, but I would not promise a living baby by version. The personal equation then, becomes a most important element in the case. The results in this instance justified the treatment adopted, as they doubtless would had Dr. Potter delivered by version.

When one reviews the management of a case however, as I have done, after a section had been refused, and I had been forced to extract a breech presentation in an old primipara of forty-five with a very rigid os, and when one compares a living healthy infant and a com-

^{*}Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

paratively uninjured mother delivered by section, with a dead baby and a badly lacerated mother with little prospects for future pregnancies lying before him, he is compelled "by the brute force of the facts" to extend his indications for cesarean section or quit the practice of obstetrics; he dares not jeopardize more lives by doing versions until he acquires the skill of the masters of that art.

Naturally no one would claim that all breech presentations in old primipara with rigid cervixes should be delivered by section, but I am convinced that there are cases in the hands of certain operators where that should be the operation of choice.

My associate, Dr. Don F. Cameron, recited a case which happened while this paper was in process of preparation which illustrates this point. He was called a distance of thirty miles to see a woman who had gone into labor twenty-eight hours previously. Her attendant found an arm and a leg protruding from the vulva together with a loop of umbilical cord. He made an attempt to deliver by podalic version but failed because he could not get his hand into the uterus on account of a contraction ring. A consultant was called in and his attempt at delivery failed because of the same Bandl's ring. Traction on the prolapsed leg also failed. When Dr. Cameron arrived the cord had ceased pulsating and another effort, under deep anesthesia, to get above the contraction ring failed. They were then simply driven to cesarean section.

In reviewing a fiasco of this kind one cannot refrain from wishing that section had been done after it was first found to be impossible to dilate the uterus sufficiently to perform version and while the cord was still pulsating. The material trauma would not have been so great and the baby would doubtless be living today. The mother recovered.

Bourne¹ reports two sections for contraction ring, showing that others have encountered the same condition.

In the case of high forceps operations in posterior positions of the occiput I have much the same complaint to make.

I review some of my early experiences with regret in the light of satisfactory results with cesarean section, for it certainly is not pleasant to present a mutilated dead infant to a badly damaged mother as the net result of your skill in obstetrics. It is not consoling either to reflect that there are those who could have done much better.

Here again I would not be understood as recommending cesarean section in every posterior position where there has been no engagement after twenty-four or forty-eight hours of active labor. Some men should elect version or the forceps. If there is any question as to the possibility of a living child being born through the birth canal by these means, then I should recommend cesarean section at once. The pelvic diameters may apparently be ample, but if the gestation has been prolonged and the position of the presenting head such that proper and

complete flexion cannot be secured, section should be chosen if the environment is at all suitable. However, one may have an experience such as the following: Five years ago I delivered a primipara after thirty-six hours of ineffectual labor. Her attendant assured me that it was a borderline case on account of a short conjugate and the L.O.P. We delivered by section. Two years later she delivered herself before the doctor arrived. Under these circumstances it is not only the patient who wonders whether the proper treatment was selected in the first instance.

Dr. Asa B. Davis, whose technic I adopted after hearing him describe it about fifteen years ago, writes me as follows on this point: "We also find that the size of the child varies in different pregnancies. It is quite possible for a woman to develop a very large child in one pregnancy, making cesarean section the only mode of delivering a living child. In a subsequent pregnancy her child may be smaller to the extent that she may have an easy vaginal delivery."

One may now find support for these views regarding the high forceps operation which was not possible some years past.

Essen-Möller² declines high forceps, version, or craniotomy in difficult labors if the mother is not infected. When there is undoubted infection present the Porro operation is done.

Lackie³ advises section rather than high forceps in slight degrees of contraction (3.5 inches or less) because of high maternal mortality and morbidity and high fetal mortality.

There are other less frequent indications for cesarean section.

Several years ago I was asked to see a para vi in the sixth month of uterogestation. The patient presented symptoms pointing to a perforative appendicitis for which we operated, removing a gangrenous appendix and placing a large gauze drain back of the uterus. Much to our surprise she recovered without miscarrying. As the end of her period of gestation approached we were much concerned as to the proper treatment. We felt sure that there were dense adhesions between the uterus and the abdominal wall, and we were in doubt about the ability of the uterus, by its own unaided contractions, to free itself from the belly wall; if it were able to free itself we were in doubt about the amount of hemorrhage such separation would produce. If the uterus could not pull itself loose from the abdominal wall, then forceps would be needed to deliver the baby and if the uterus could not contract sufficiently after the delivery, a severe postpartum hemorrhage seemed certain. Letters to well-known obstetricians did not tend to reassure us as similar cases had not then been encountered.

We determined to open the abdomen when labor began, separate the adhesions and ligate the bleeding points, then complete the delivery through the abdomen, or close the belly and deliver through the vagina

as seemed best. Therefore, a few hours after she went into labor we opened the abdomen, and while we found many adhesions they were neither so numerous as we had anticipated nor so strong, and it is highly probable that the uterus would have been able to deliver itself without much bleeding from the torn adhesions since none of them required ligature. The cesarean section was completed because of the strain that would have been put on the stitches by the contractions of the abdominal muscles. She made a good recovery and delivered herself unaided two years later. Since that time others have had the same situation to deal with.

Strassemann⁴ did an abdominal cesarean section for adhesions following pelvic abscess. The adhesions were very dense between the uterus and abdominal wall. The uterus was ruptured during the efforts at removal, but was finally removed, unopened. The baby was dead and very foul.

The Kelly operation is sometimes responsible for a cesarean section. It should not be done till after the childbearing period has been passed. Dougal reports a cesarean section done for this reason and another done because the labor was obstructed by a nongravid horn of a double uterus.

A previous cesarean section is sometimes an argument for a second, and by the same token it may be advanced as one of the arguments against choosing that form of delivery originally.

The dictum, "Once a cesarean always a cesarean," has been advanced in this assemblage. I do not think it holds in every case. In fact, where it is done merely because it had already been done, it seems to me to be a reflection on the surgeon. However, in a recent "borderline case" it really became the determining argument. Dr. Garrette Van Sweringen, the attending obstetrician, assured me that he could deliver with forceps even though the diameters were short and the head in a posterior position. He thought, however, that there would be less risk if another cesarean section were done. The uterine scar of the previous operation was perfect. We succeeded in getting a living baby and a comparatively uninjured mother. I was importuned to resect the tubes in this case but refused on the ground that she was as able to go through a subsequent pregnancy and test labor as she was the first and second.

As indicated above, the fact that cases of rupture of a uterine scar have been reported constitutes a contraindication for the operation, unless other considerations outweigh it.

The autumn and winter issues of the *British Journal of Obstetrics and Gynecology*, of 1921, are devoted to a discussion of cesarean section. In these issues Holland contributes an exhaustive paper on "Rupture of the Cesarean Scar," reporting five cases. He states the frequency to be 4 per cent and that the accident is due to imperfect

healing. Further, that rupture occurs almost as frequently during pregnancy as during labor. Infection is the great cause of imperfect healing. He says that catgut should not be used because the liability to rupture after catgut is two and one-half times greater than after silk.

D. S. Hillis,⁵ of Chicago, reports four cases of "Rupture of the Uterus" admitted to Cook County Hospital from February 26, 1923, to October 10, 1923, all at the site of previous scars. They all recovered on removal of the uterus.

Most of the cases of rupture of the uterus through a previous scar have been in the lower segment. This is due to the fact, perhaps, that most operations are done low down.

Kerr uses a low transverse incision and closes with catgut for the mucous membrane and linen for the muscles. He then uses catgut to bring the bladder back to its normal position. He reports 22 cases with that technic with one fatality, one spontaneous delivery, and four repeated sections.

It is my unsupported opinion that longitudinal scars in midline of the upper pole of the uterus are less likely to rupture if the wounds are properly repaired. The mucous membrane may be brought together with catgut. There should then be two rows of interrupted linen or silk stitches to the muscular walls and the peritoneum closed by catgut. Then to prevent adhesions, a continuous Cushing stitch of catgut should be used to cover in the over and over approximating and hemostatic stitch.

Two cases are reported (*Jeff. Med. Coll. Clinic*, and *Hillis*) where rupture of the uterus occurred distant from the site of a previous scar, so that disease of the uterine musculature may conduce to rupture at any point including the site of a former operation.

Placenta previa is coming to be recognized more and more as a condition best treated by cesarean section.

Lonne⁶ discussed a series of 200 cases of placenta previa treated by dilating bags. There were four deaths from central placenta previa treated by version and extraction. In two there was fatal hemorrhage after the uterus had been emptied and there were three deaths from septic infection. He says that in contrast with delivery by cesarean section the use of the bag is at a disadvantage.

Freund⁷ recommends delivery by cesarean section in placenta previa centralis and the majority of those who discussed the paper before the Berlin Society endorsed his stand.

The object of this paper will have been accomplished if it shall induce those of us who engage in the practice of obstetrics to weigh carefully the advantages to both mother and child of cesarean section over many high forceps applications. Low forceps operations are frequently so simple and so satisfactory that many young physicians

hasten to apply them before engagement, or with incomplete engagement, only to find that what seemed to be a minor obstetric procedure has become a very major operation.

Also, if it shall induce surgeons to pay more attention to the closure of the uterine wounds, remembering that perfect apposition throughout is hard to secure on account of the uneven contractility of the muscular walls.

Also, if it shall help us to realize that the maternal measurements are, after all, only relative; they are to be recognized as adequate only when they will permit the passage of the fetus and this problem varies with each and every pregnancy.

In conclusion let me remind you that morphine preliminary to the anesthetic makes the work of resuscitating the infant more hazardous.

REFERENCES

- ¹Bourne: Jour. Obst. and Gynec. Brit. Emp., 1921, Nos. 3 and 4.
- ²Essen-Möller: Monatschr. f. Geburtsch., 1921, liv, 121.
- ³Lackie: Jour. Obst. and Gynec., 1922, xxix, 377.
- ⁴Strasemann: Zentralbl. f. Gynäk., 1922, No. 46, p. 1852.
- ⁵Hillis, D. S.: Surg., Gynec. and Obst., July, 1924.
- ⁶Lonne: Monatschr. f. Geburtsch. u. Gynäk., 1921, lv, 190.
- ⁷Freund: Ztschr. f. Geburtsch. u. Gynäk., 1923, lxxxv, 581.

701 WAYNE PHARMACAL BUILDING.

(For discussion see page 256.)

THE OCCIPUT POSTERIOR*

BY PERCY W. TOOMBS, A.B., M.D., F.A.C.S., MEMPHIS, TENNESSEE

AMONG the difficulties encountered by the obstetrician there are a few more potentially disastrous than the persistent occiput posterior. Thanks to nature's versatility nearly 90 per cent of primary posterior positions rotate and deliver occiput anterior, and with these we are not concerned. Of the remaining 10 per cent, comprising the persistent posteriors and those in which anterior rotation is arrested before completion, practically all will require the aid of the attendant if a happy outcome is to be expected.

The early diagnosis of this condition is indispensable to the attendant. Each case must be individualized and, notwithstanding the high percentage of anterior rotation and spontaneous deliveries present in current statistics, it must be borne in mind that the case in question may possibly be numbered among the less fortunate 10 per cent; thus precaution should be taken to aid nature when necessary and, if possible, secure anterior rotation, flexion, and descent with as little and timely interference as possible.

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

In incidence, authorities today believe primary posterior positions are much more frequent than was formerly believed, the reason being a more accurate examination revealing the true conditions present, whereas much faith was formerly placed on the position of the fetal heart tones and not enough proficiency attained in abdominal palpation and rectal touch. In many instances an accurate diagnosis is possible from abdominal palpation alone, to be confirmed later by rectal touch when the cervix has either thinned or dilated sufficiently to permit precise palpation of the cranial sutures and fontanel. The four maneuvers outlined in the modern texts on obstetrics should always be painstakingly carried out with attention to detail and repeated practice. Palpation of the fetal head at the pelvic brim, the location of the anterior shoulder and resistance of the back are of great importance, particularly the palpation of the head. The position of the fetal heart tones and soft parts, while corroborative, are conducive to an erroneous diagnosis if relied on to any great extent.

With the occiput posterior, either to the right or left as the case may be, the following points will be observed: The rounded prominence of the brow over one pubic ramus and usually nearer the midline than the occiput, thus showing a deflexion of the head, as a rule found in presentations with the occiput posterior; the anterior shoulder away from the midline and approaching the flank, with the resistance of the back well in the flank. The fetal heart will be heard probably in the same flank, though possibly in the opposite lower quadrant where the deflexion has thrown the chest against the anterior abdominal wall, thus permitting the tones to be heard with distinction and, if relied upon exclusively, suggesting a diagnosis of the opposite anterior position.

The rectal touch picture confirming the above,—and this is only possible before an extensive caput formation has obliterated the cranial landmarks,—will disclose the sagittal suture in an oblique diameter of the pelvis, converging posteriorly with the two lambdoidal sutures to form the usually obliterated posterior fontanel and anteriorly terminating in the larger more rectangular anterior fontanel with its four radial sutures.

If conditions are favorable much may be learned from the touch picture; the amount of flexion or deflexion by the height of the two fontanel, the degree of engagement by the relation of the presenting part to the ischial spines, the amount of dilatation and effacement by the cervix, the condition of the bag of waters, hardness of the fetal head, and the amount of molding taking place. If the examination is made during a pain the direction of the internal rotation, the efficiency of the bag of waters as a hydrostatic dilator, and the amount and probable course of descent may be estimated.

In reviewing the causes of primary posterior positions the usual association of a moderate pelvic contraction or at least some disproportion

tion between the fetal head and the pelvic inlet must be noted. Here, as descent occurs, the occiput instead of sinking into, impinges upon the rim of the pelvic inlet, creating a certain amount of deflexion, resulting in a military attitude or possibly a more marked condition depending upon the amount of resistance encountered. The long arm of the occipital lever is lost, and when the inclined planes of the birth canal are called upon to assist in anterior rotation their function is but imperfectly or, at most, with extreme difficulty accomplished. Thus is seen nature's handicap; not only the greater arc of the circle must be transversed by the rotating occiput, but also because of the imperfect flexion this is made doubly hard through lack of a perfect leverage. It is from such cases as these the resulting transverse arrests arise and require the aid of the attendant if a happy outcome is to be expected.

Directly opposed to the small pelvis as associated with this condition, mention must be made of the justomajor pelvis with normal size baby. The pelvis is too large, the passage and passenger do not fit, the normal mechanism of labor is not brought into play, and the inclined planes do not come in contact with the occiput as a perfect lever. In this instance flexion is not essential to the accomplishment of descent and as flexion is absent or imperfect, rotation will also be retarded as in the above indicated mechanism. Such cases are often multiparous patients with imperfect pelvic floors and surprising difficulties will often be encountered when assistance becomes necessary. Such a head is usually rotated with ease but has a tendency to regain its former position unless prevented from so doing. To my mind, here and only here is a Scanzoni rotation justifiable. These cases will often deliver spontaneously with the occiput posterior if permitted to do so, and where the pelvic floor and perineum are greatly relaxed and damaged from previous labors no further harm will be done other than a prolonged labor with the added pounding of the fetal head on the perineum.

Among the conditions predisposing to a posterior engagement of the occiput are: lax abdominal walls, the fetal back fitting the mother's flank more easily; polyhydramnios, causing the fetus to sink into one flank; peculiarities of musculature of the inlet; rigid abdominal muscles and pronounced sacral promontory; the rigid muscles forcing the fetus into one flank, the head engaging in the oblique diameter, with occiput toward the flank; the last is a frequent cause of posterior positions in young vigorous primiparous women.

The mechanism of labor in occiput posteriors is essentially the same as in anterior positions; namely, flexion, descent, rotation and restitution, except that the occiput must transverse the greater arc of the circle of rotation if it is to be born anterior.

As stated at the outset, nature is able in about 90 per cent of instances to terminate these cases without aid, despite such obstacles as the usual deflexion and the greater arc of rotation. However, prac-

tically 100 per cent of those that do not rotate spontaneously require the aid of the attendant.

Anterior rotation may be arrested at any point in the birth canal though posterior rotation does not usually occur until the occiput reaches the sacral concavity which gives rise to the occipitosacral position.

In the management of these cases, first of all, watchful expectancy is the rule, in the hope that nature will overcome the condition as so often happens. An accurate diagnosis of existing conditions is indispensable: the disproportion, if present; deflexion of the head; condition of the fetal heart; age and condition of the mother; character of the uterine contractions and their frequency; the attitude of the rotating occiput,—all of these must be kept in mind and observed frequently in order to detect the first signs of impending danger.

During the first stage postural treatment should be tried; this can only be of aid before engagement has occurred and consists in allowing the mother to rest on the side opposite that in which the fetal back is lying in the hope that the fetus will gravitate over to the other side and thus become anterior. Especially should the mother be cautioned against bearing down efforts as it is an admitted fact that these cases are particularly prone to a premature rupture of the membranes with its resultant dry labor and added insult to an already overburdened nature.

When the membranes rupture prematurely, and the fetal head fits closely the partially dilated cervix, the introduction of a bag will often bring about dilatation more quickly and, aided by synergistic analgesia, conserve the strength of the mother for the more trying second stage. It must be admitted that this is not acceptable as a routine measure, but in a well-equipped maternity hospital and in selected cases it would seem a rational procedure, though as a rule a reliance must be placed on morphine in some form to lessen the suffering of the mother without the aid of active interference, for such action is bound to lead to an increased morbidity and hence is not always justifiable without more pronounced indications.

The arrest of the head at the pelvic inlet with the occiput posterior occurs before rotation has begun and is hardly a subject to be treated in this paper, as such a condition indicates a mechanical disproportion either primary or due to a deflexion attitude, sometimes both. When due to primary disproportion without deflexion it then becomes the duty of the attendant to determine whether, after sufficient molding, the delivery from below is possible with a minimum of trauma. Such cases, regardless of the position of the occiput, should be handled with extreme care. Any arrest of the head at the inlet in a primipara early in labor should be looked upon as potentially a condition necessitating a cesarean section, which in turn demands painstaking attention to

asepsis at all times prior to and during early labor. When frank disproportion is apparent an elective section is the method of choice. However, with the late and well-deserved popularization of the low cervical section, a real test of labor may be permitted with safety, nature often surmounting apparently impossible obstacles and birth of the baby taking place spontaneously. Version in these cases should be mentioned only to be condemned.

When the arrest at the inlet is due to deflexion of the head with the occiput posterior there are several things to be considered: first, the usual incidence of contracted pelvis in primary posterior positions of the occiput, indicating a relative disproportion; second, the usual deflexion present in such cases enhancing the disproportion already present. Such cases as these and the borderline cases of disproportion previously mentioned require mature obstetric judgment for their successful solution and tend to swell the already adequate category of conditions confirming the practice of obstetrics to the realm of art rather than bringing about that much to be desired state, an exact science.

Upon completion of the first stage, if molding fails to secure engagement under nitrous oxide or ethylene anesthesia, I insert my whole hand properly gloved, grasp the occiput, if to the left, with the fingers of the right hand, and vice versa, making traction, at the same time pushing up on the brow and rotating the occiput to a more favorable attitude; by pressure of the outside hand over the symphysis the head is kept in as close apposition to the pelvic brim as possible. Attempt is made to rotate the shoulders and back anteriorly at the same time. The anesthetic is then removed and under action of the next few pains the head will often engage without difficulty. We then determine whether the case should be left to nature or whether forceps should be applied and delivery accomplished with the aid of art. If it is observed that the head engages and its new position is maintained, and descent occurs with a few succeeding pains, the case had best be left to nature unless some other indication for active interference is present.

On the other hand, if after the above attempt, descent does not occur, the anesthetic should be continued, forceps applied to the head in its corrected position and traction made in hope of successful engagement. Where malposition is responsible for the arrest, either the head will engage or forceps will be successful; however, high forceps are to be looked upon only as an experiment, and should they be unsuccessful, recourse can only be had to craniotomy out of justice to the future health and well-being of the mother. I cannot, as yet, sanction cesarean section, either high or low, following attempts at delivery by nature's channels in the hope of obtaining a living child to succumb later from the previous attempted delivery; not to mention the added maternal risk, which in itself should contraindicate such procedure.

Deep arrest of the partially rotated head particularly in a primipara

would immediately suggest the possibility of an associated funnel pelvis. Such a condition should have been discovered when the pelvic measurements were taken during the antepartum examination, and if the outlet was found sufficiently contracted, a cesarean section should have been done in early labor.

On the other hand, if the outlet is sufficient and the arrest occurs according to the mechanism previously outlined in this paper, the best results will be obtained by manual rotation and delivery by forceps. These cases will usually be found with the presenting part at the spines or below, with the sagittal sutures running transversely across the mother's pelvis.

Under anesthesia, by grasping the occiput with the left hand in cases of L.O.P. and vice versa, the head may often be rotated without dislodging it from the pelvis, always making pressure on the head over the symphysis with the free hand and rotating the shoulders at the same time. If the occiput can be rotated to the opposite anterior position, that is, past the midline, backward rotation will not occur. If rotation is only effected, for instance, from an L.O.P. to an L.O.A. the head should be held in its new position by the rotating hand until the blades of forceps are in place and traction fixes it in its new position. It is now better to effect delivery at once as maternal and fetal distress are usually present.

Particularly does it exert a bad depressing influence on the mother if after laboring so long she is put to sleep in the hope of obtaining relief and on awakening finds that she must continue her battle. Such action, as a rule, only necessitates a later forceps delivery and nothing is gained by such delay.

In the manual rotation and application of forceps to these cases it is better not to dislodge the head if possible. Correctly applied pressure by the inside hand is a great aid in this maneuver. It sometimes happens, however, that rotation cannot be performed satisfactorily; then it becomes necessary to dislodge the head in order to rotate it to a new position. The great danger here is the possibility of a prolapsed cord; such a catastrophe indicates an immediate version and extraction if manual reposition cannot be accomplished.

Having rotated and flexed the head into an anterior position, forceps are applied to the sides of the child's head and traction will effect delivery. In applying forceps, if the under, or stationary blade, be applied first, i.e., in O.D.A., the right blade, and vice versa, and held by an assistant, the wandering blade may then be applied without disturbing the head from its new position. In primiparous patients episiotomies should be performed routinely, and in multiparas the dilatation of the perineum with tincture of green soap is very efficacious.

A final survey of posterior positions brings to light a condition the presence of which should be the duty of every obstetrician to guard

against; namely, the neglected occipitosacral. From the standpoint of fetal mortality this is a truly disastrous condition. With a history of long suffering, maternal and fetal exhaustion are evident, the examining hand discloses the fetal head firmly driven into the pelvis and all cranial landmarks obliterated by a large caput. The location of the ear is the only means of determining accurately the position of the head. The membranes, as a rule, will have been ruptured for hours, the uterus clamped vise-like upon the child's body with a possible localized contraction ring and thinning of the lower uterine segment to the point of danger. Regardless of what is done the probability of delivering a stillborn fetus is very likely. Manual rotation is next to impossible without a very deep anesthesia; however, it should be tried in the hope of saving the mother extensive laceration. If this fails and the child is still viable, forceps should be applied under deep anesthesia; and with an episiotomy extending into the levator muscle, delivery should be effected. The alternative here, where fetal life is at a low ebb from the repeated pounding against the perineum and possibly irreparably damaged from repeated attempts at delivery, necessitates in the interest of humanity and tenacity to sound obstetric judgment that gruesome and much to be deplored operation, a craniotomy.

1042 MADISON AVENUE.

(For discussion see page 256.)

THE RELATION OF THE PHYSIOLOGY AND MECHANICS TO THE MANAGEMENT OF LABOR*

BY W. A. FOWLER, M.D., F.A.C.S., OKLAHOMA CITY, OKLA.

(From the Department of Obstetrics, University of Oklahoma, School of Medicine)

THE selection of this subject seems justified by the widespread and apparently increasing disregard of physiologic and mechanical facts and the violation of established principles in the practice of obstetrics. There is too often the tendency to ignore the marvelous adaptability of the natural process of labor to the purpose of reproduction. It is my firm belief that this tendency is responsible in a large measure for the unsatisfactory results of obstetric practice in this country.

In the first stage of labor the process is one merely of alternate contraction and relaxation of the uterus. Natural labor pains will very rarely last longer than a minute and a half and there is a sufficient interval between pains to permit the refilling of the sinuses and proper oxygenation of the fetal blood. While the contractions occur with considerable force, the bag of waters and the presenting part press evenly outward, accomplishing dilatation of the cervix with the utmost gentle-

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

ness. The fascial and ligamentous supports of the uterus are uninjured. There is little shock or exhaustion, provided the patient is given the necessary rest and food.

In the second stage the force of the bearing down efforts of the patient is added to the force of the uterine contractions. The resistance of the pelvic bony and soft structures is offered to the fetal head. There is gradual gentle stretching of the soft parts and molding of the head. It is a period of greater danger to both patients, requiring closer supervision. If the forces are not naturally so, they can usually be directed within the limits of safety. In the third stage, the alternate contraction and relaxation of the uterus is ideally favorable to the detachment and expulsion of the placenta without serious loss of blood.

The fetal head acts mechanically as a wedge in labor,—a blunt oval and poor dilator at the tip but quite effective near its largest part. This accounts for the more intense suffering of the mother, the frequent bloody discharge from the usually slight and unimportant tears of the cervix, and the slowing of the fetal heart tones as the largest part of the head passes through the cervix. If the head is forced downward before complete dilatation of the cervix or if the rectum and bladder are distended, the advancing head may drag upon and injure their supports. The structures below the level of the levator muscles retard the head, permitting the more gradual dilatation and less frequent tears of the levator muscles and their fascial sheath, so important in pelvic support. As the large part of the head reaches the less important structures below, tears are frequent unless the head is retarded and time given these structures to stretch.

The bones of the skull, the unruptured bag of waters in the first stage of labor, and the two sheaths of fascia within the skull, the falx cerebri and the tentorium cerebelli, tend to prevent excessive molding of the head which may cause serious damage to the brain. Besides these functions these dural sheaths convey most of the large intracranial sinuses and, as elucidated by Crothers,¹ also play an important part in the control of intracranial pressure. The tentorium which forms the roof of the cerebellum and is supported by the falx attachment, protects the vital areas below from much of the pressure incident to compression of the cranial vault. Tears may permit the collapse of the tentorial roof, in which case the supratentorial pressure will be brought to bear in a larger measure upon the cerebellum, and the medulla may be pressed against the anterior lip of the foramen magnum.

The occipitoanterior position with good flexion is ideally suited for the safe outcome of labor. It permits the maximum utilization of time, a very important factor in the adaptation of plastic and elastic structures. It presents the smallest plane of the fetal skull, the suboccipitobregmatic, making necessary the minimum adjustment between the fetal head and maternal structures. Molding, being toward the firmer

posterior portion of the cranial vault to which is attached both the falx and tentorium, is least likely to be too sudden or excessive. The wider anterior fontanel and sutures leading into it permit the depression of the anterior part of the cranial vault incident to molding in this position with less danger from overlapping of the bones. Pressure upon the buttocks by the contracting uterus tends to maintain complete flexion and, since the spinal column is about two inches shorter when compressed than when extended, there is a diminution in the subtentorial space with a corresponding increase in subtentorial pressure.¹ This tends to equalize somewhat the supratentorial and subtentorial pressure and lessens the danger of tentorial tears. In cases of occipito-posterior position and the various degrees of deflexion the larger plane of the skull which engages, necessitates a greater degree of accommodation between the head and the maternal soft parts, the molding of the head is in a less favorable direction, and the oval shape of the presenting plane predisposes to irregular and ineffectual uterine contractions and early rupture of the bag of waters.

In foot-first deliveries there is the necessity for a rapid adaption between the fetal head and the birth canal which is prone to result in more injuries to both. The subtentorial is diminished as compared to the supratentorial pressure, resulting in a downward pressure upon the tentorial roof. At the same time the vertical bulging of the head pulls upward on the tentorial attachment of the falx. This mechanism is decidedly conducive to tentorial tears. Traction on the feet and suprapubic pressure on the head exaggerate this condition. Maintenance of complete flexion is difficult. Any degree of traction on the feet is conducive to extension of the head with all the disadvantages of that mechanism. The danger of injury to the spinal cord and of fracture of the vertebrae is also a real one. Potter has made a valuable contribution to the technic of version in emphasizing the great importance of endeavoring to overcome the resistance of the soft parts before performing version and of exercising extreme deliberation and gentleness in the management of the after-coming head.

In premature babies the softness of the bones of the skull and the greater friability of the soft structures result in more frequent birth injuries, notwithstanding the easier labors in these cases.

Tears of the septa or hemorrhage, or both, may be found in at least half of the stillborn and dead newborn babies if proper search is made. Holland² found tentorial tears in 81 of 167 cases. Of these 35, or 43 per cent, were delivered feet first and 25 of the 46 vertex cases were forceps deliveries. He found tentorial tears in 88 per cent of dead fetuses after normal breech deliveries. Cruickshank³ found that 47 per cent of mature cases and 52 per cent of premature cases with tentorial tears, were delivered feet first. Divide these percentages by 5, the average percentage of foot-first deliveries, and these statistics indi-

cate that tentorial tears are eight to ten times as likely to occur in foot first as in vertex cases. Saenger,⁴ in autopsies on 100 newborn babies, found that of 23 children delivered feet first, only 3 failed to show tentorial tears and only 1 failed to show hemorrhage. Of 46 cases of hemorrhage, 22, or 48 per cent, were among the 23 babies delivered feet first. Browne,⁵ from a study of 400 autopsies, concludes "that breech delivery is ten times as likely to give rise to cerebral hemorrhage as delivery by the vertex," and "that cerebral hemorrhage is seven times as likely to occur in premature infants as in infants at term." Pierson⁶ reports 142 viable primary breech deliveries with 18 fetal deaths (12 per cent) and 87 viable version and breech deliveries with 18 fetal deaths (26 per cent). Eliminating the cases with no autopsy, those in which the condition of the spinal cord was not noted and the craniotomies, there were 22 of the 36 cases with complete autopsy data. Of 12 primary breech cases, 7 had fractured vertebrae in one of which the cord was severed. Of 10 version and breech cases, 7 had fractured vertebrae, 1 with complete and 2 with partial severance of the cord. In only 2 of the 22 cases, one in each group, were the brain and spinal cord normal. It should be remembered that these statistics are taken from some of the foremost obstetric clinics of the world where the quality of the service may reasonably be supposed to be of a high order.

The life of the fetus depends not upon the cerebrum and cerebellum, but upon the vital centers in the medulla and upper cord segment. The dangers to these centers during labor are from asphyxia and trauma. They may be rendered inexcitable by pressure against the anterior lip of the foramen magnum or by so slight an accident as the leakage of blood in this region. They are indicated clinically by a marked slowing of the fetal heart rate.

On the other hand the vital centers succumb to asphyxia much less readily than was indicated by the old teaching that death from asphyxia would follow unless the head were born within six or eight minutes after the umbilicus in breech deliveries. Experiments indicate that the cells of the medulla can resist total anoxemia for twenty minutes. Asphyxia is, nevertheless, one of the chief dangers to the baby during labor. Frequent prolonged contractions of the uterus and increased tonicity of the uterus between pains, detachment of the placenta from whatever cause, and drugs given to the mother may cause asphyxia in the baby. Except when due to drugs that also depress the respiratory center, the early effect of asphyxia is stimulation of the center of respiration resulting in inspiratory efforts of the fetus. In the first stage of labor this results in the insufflation of liquor amnii into the fetal lungs. The amniotic fluid is usually sterile as long as the membranes remain intact. Since the cervix is infected in about 50 per cent of women and the amniotic fluid is a good culture medium, the latter

becomes infected in a large percentage of cases soon after rupture of the membranes. Insufflation of infected amniotic fluid or cervical mucus may cause pneumonia, a frequent cause of neonatal death and sometimes a cause of death even before birth.⁷ In the late stages of asphyxia there is depression and finally paralysis of the center of respiration and a tendency toward hemorrhages in various parts of the body. Asphyxia is indicated clinically by slowing of the fetal heart tones, and sometimes by visible inspiratory movements.

The tragic consequences of lesions of the cerebrum and cerebellum are manifested by the morbidity that follows damage to the sensory-motor tracts.

In the light of the physiology and mechanics involved the general principles to be followed in the management of labor would seem obvious. In addition to asepsis, these are: In the first stage, the correction, if possible, of any unfavorable presentation or position of the fetus; providing the patient with the needed amount of rest and food; proper attention to the bladder and bowels; watchfulness as to the condition of both patients including observation of the fetal heart tones, and the temperature, pulse, and respiration of the mother.

In the second stage the same general management should prevail, plus closer observation of both patients and the control of the bearing down efforts and the advancement of the head within the limits of safety. If the fetal heart tones remain below 100 between pains, this should be taken as a sign of grave danger to the baby. If the pains are frequent and severe with little intermission, the patient should be instructed to refrain from bearing down and the suggestion of Frey,⁸ that she be given an anesthetic for a short time to diminish the severity of the pains, would seem logical. Should the fetal heart tones still remain slow, delivery should not be delayed. In premature delivery, the resistance of the perineum should be overcome by dilatation or incision.

In the third stage, until the placenta becomes detached, when it may be easily expressed, the same policy of noninterference with the natural process should be followed, except in cases of hemorrhage. Departure from these principles long established in obstetric teachings, should be undertaken only for real and proved reasons.

The use of bearing down efforts in the first stage is perhaps, at the same time, the most widespread and most senseless form of interference with the course of labor. I know of no one who would defend the practice. Certainly, it has no logical defense. Among the immediate effects are the stretching and tearing of the supports of the uterus, rectum and bladder; hemorrhage from elongation of the anterior lip of the cervix or from laceration, and exhaustion of the patient. The frequent later effects are prolapse and retroversion of the uterus, cystocele, rectocele, lacerations of the cervix and cervicitis, with the definite

morbidity of these conditions often unrelieved by operation. The practice is altogether pernicious in the first stage—and that means until the cervix has passed entirely over the presenting part and beyond the reach of the examining finger.

Pituitary extract under various names, is still used by many men in practically every case where time will permit its administration. It is given to increase the frequency, duration, and severity of the uterine contractions, which it does, frequently in a lawless manner. It also increases the tonicity of the uterus between pains. In 1916 Mundell collected and reported 1293 cases of its use, with ruptured uteri in nearly 1 per cent of cases, and fetal death attributed to the drug or asphyxia in 7 per cent of cases. Its administration before the birth of the child should be limited to cases of uterine inertia in the second stage of labor with unobstructed delivery,—a very rare combination.

Manual dilatation of the cervix is another procedure too often undertaken for insufficient reasons. The frequently used term, "dilatable cervix," is a pitfall for obstetric disaster. I know of no condition in which the cervix cannot be either dilated or torn, nor of any condition in which manual dilatation can be accomplished without great danger of laceration. My own experience is in thorough accord with Polak's statement that the manually dilated cervix is a manually torn cervix in nearly every case. This procedure should be undertaken for only such indications as justify the definite hazard of a damaged cervix. Like other obstetric procedures, it is frequently undertaken on account of exhaustion of the mother, a condition often more imaginary than real, but the logical treatment of which, if present, would seem to be rest rather than an operation which may cause profound shock.

Routine delivery by version and forceps has been championed by Potter and DeLee respectively. I am sure that their genius and operative dexterity enable them to minimize the dangers of these procedures. I do not believe, however, that it has been established that they are safer, even in the skilled hands of these men than less radical procedures. In the hands of the average man, their more frequent employment is making a substantial contribution to the mortality of obstetrics,—just about neutralizing the real benefits of better prenatal care.

The emphasis which has been placed in recent years upon what has been called the "pathogenicity of parturition" has had as its natural effect, the tendency to substitute artificial for natural delivery, by extending indications for various operations, or by so perfecting the technic of a particular operation as to justify its routine employment. Proper management in labor is not unlike proper practice in any other field of medicine in these respects. Supposed wizardry in the execution of any particular procedure does not constitute a panacea for all troubles; it is rather the logical dealing with whatever condition may be present, predicated upon the ability to diagnose, plus a full knowl-

edge of the physiology, mechanics, and pathology with which we have to deal. If we feel inclined to operate more often, we should be sobered by the fact that in England, where two-thirds of the deliveries are by midwives, who by law are not permitted to operate, the reported maternal mortality according to Fairbairn⁹ is less than half that in the registration area of the United States. When interference is indicated, there should be as little departure from the physiologic as possible, both in the application and in the amount of force employed. The biologic reason for conservatism lies in the fact that both the maternal and fetal organisms have become accustomed to natural labor by ages of experience and will, as a general rule, suffer less harm from such a labor than from an operative delivery, however skillfully performed.

REFERENCES

- ¹Crothers, B.: Surg., Gynec. and Obst., 1923, xxxvii, 790.
- ²Holland, E.: Jour. Obst. and Gynec. Brit. Emp., 1922, xxix, 531.
- ³Cruikshank: Ref. AM. JOUR. OBST. AND GYNEC., January, 1925, p. 141.
- ⁴Saenger: Ref. AM. JOUR. OBST. AND GYNEC., January, 1925, p. 141.
- ⁵Browne, Francis J.: Edinburgh Med. Jour., September, 1924, pp. 158-203.
- ⁶Pierson, R. N.: Surg., Gynec. and Obst., 1923, xxxvii, 802.
- ⁷Johnson, W. C., and Meyer, J. R.: Am. Jour. Obst. and Gynec., 1925, ix, 151.
- ⁸Frey, Reference by Ehrenfest, Zentralbl. f. Gynäk., 1924, xlviii, 947.
- ⁹Fairbairn, J. S.: Jour. Obst. and Gynec. Brit. Emp., 1925, p. 139.
- ¹⁰Ehrenfest, Hugo: Birth Injuries of the Child, New York, 1922, D. Appleton Co.
- ¹¹Idem—Gynecological and Obstetrical Monographs, Appendix, New York, D. Appleton Co., 1925.

101 EAST SEVENTH STREET.

(For discussion, see page 256.)

PREPARATION OF THE EXTERNAL GENITALIA FOR DELIVERY WITH IODINE-ALCOHOL: REPORT OF 100 CASES SO TREATED, WITH BACTERIOLOGIC RESULTS*

BY BURNLEY LANKFORD, M.D., NORFOLK, VA.

WE read frequently that the mortality from puerperal sepsis is not decreasing in the United States and that it has remained practically the same between 1904 and 1920. This ought not to be. There must be a number of reasons why puerperal sepsis, a germ disease, a preventable disease, has remained with a high mortality, while the other germ diseases are rapidly vanishing from the earth.

We learned as far back as 1843 from Holmes, Semmelweis, and others, to wash our hands before, rather than after, delivering a woman: years later, we learned from Pasteur and Lister why we should do this. Later still, we learned to keep our hands out of the vagina as much as possible, during and shortly before labor, and that every vaginal examination, over one, greatly increases the risk of sepsis. We know that we must work through a surgically clean field. The simpler and easier it can be made to obtain such a surgically clean field, the more readily it will be followed by the men in general practice, who, from the difficulties under which they practice, must have at their disposal, a simple technic. Most of the obstetrics throughout the country is still done by the men in general practice, and it lies in their power to appreciably cut down the incidence of puerperal morbidity and mortality. That surgically clean surroundings can be had in the most humble circumstances, is proved by the excellent results now being obtained in the out-patient departments of the large maternity hospitals of many of our great cities. It seems settled that we must combine antisepsis with asepsis if we would succeed in effecting a clean delivery, and this paper will deal very briefly with the one detail of the preparation of the external genitalia, since we know that working through a dirty field is one of the conditions that must obtain in keeping up the high incidence of puerperal morbidity.

After hearing Dr. Titus' paper at Cleveland last year, it occurred to me that it might be worth while to prepare a number of cases with iodine-alcohol, and to note the results bacteriologically, as well as the morbidity. I had done this several years ago, with encouraging results, but only in some 29 cases. Since last year I have added 100 cases, each of them prepared and delivered by me. I am aware that 100 cases are not enough upon which to base accurate conclusions, but the study of 100 cases will show "which way the wind blows" and may stimulate

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

others with larger opportunities to confirm or contradict the observations here offered.

The plan followed has been this: Nothing is done for the patient except a cleansing enema and a close clipping of the pubic and labial hair; none have been shaved. After putting on a sterile gown and shortly before the woman is expected to deliver (some fifteen or twenty minutes) two coats of 3.5 per cent tincture of iodine (which is one-half the strength of the ordinary pharmacopeial tincture) are painted over the external genitalia, the inner sides of the thighs, in fact over all of the skin area that will not be covered by the sterile drapery. (Right here it may be remarked that a woman can be accurately draped for delivery with only four towels, one across the abdomen, one around each thigh and one under the buttocks. While this is not all that may be desired, it is enough to show that it is not intricate or difficult to obtain clean drapery, but simply requires a little forethought.) As soon as the iodine dries, it is removed or partially neutralized by the copious application of alcohol, for which purpose any of the ordinary alcohols will do. Shortly after the use of the alcohol, smears were taken from the greater and lesser labia, and from the skin area near the vulva: none were taken from directly over the anus, though that area was included in the preparation. None were taken from the vagina, further than the introitus, as the iodine did not extend further than that. These swabs were then implanted on fresh slants of Cornell media and incubated for forty-eight hours before being read. The results were as follows: 9 positive cultures, the staphylococcus being found seven times, colon-staphylococcus combined, one, and colon one. However, not one of these positive cases ran a febrile temperature, and only three of the hundred had a febrile temperature. By febrile, or morbid, temperature is meant any case that showed a temperature as high as 100.2° and lasting for twenty-four hours: or any that reached as high as 100.2° at any time during twenty-four hours for two consecutive days. Of the three febrile cases, one had a pyelitis, the patient entering the hospital with a temperature of 100° , and running a low grade pyelitis temperature for three weeks after labor. The second case had a temperature of 100.2° on the second day postpartum, 101° on third day, 103° on fourth day, reaching (and remaining) normal on the fifth day. The third febrile case had 100.2° on the second day, to 101° on the fifth day, thereafter reaching normal. The corrected morbidity therefore is 2 per cent. Both had negative blood cultures.

A further analysis of the 100 cases showed 45 primiparae, and 55 multiparae: 33 had one rectal examination, 27 had two, 15 had three, 7 had four, 2 had five, 3 had six, and 2 had seven. Thirty-eight had one vaginal examination, in addition to any rectal they may have had, 7 had two vaginal examinations, and 1 had three. The forceps was used 38 times. This would account for the rather large number of vaginal examinations, as most of the cases having one vaginal examina-

tion were forceps cases, the examination being made either at the time of application or very shortly before. Laceration of various degrees, occurred in 72 cases: certainly not a record to be proud of, but one to cause humility, and having only the virtue of honesty of report to commend it! There were 8 breech presentations, 2 versions, 2 bags, and 1 pack (induction labor). Of the three febrile cases, the patient with pyelitis had no vaginal examination and delivered herself spontaneously. One of the other febrile patients had three vaginal examinations, five rectal, was delivered by forceps and had seven sutures inserted; the other febrile patient had one vaginal and four rectal examinations, was delivered by forceps, and had nine sutures inserted.

To compare with this group of 100 cases, 100 others were analyzed that had been prepared by shaving and scrubbing with soap and water, and final use of bichloride or lysol. This latter group was delivered in the same hospital, during the same period, by a number of attending physicians, the hospital being an open one. Primiparae 55, multiparae 45; 38 had one vaginal examination, 9 had two, 8 had three, 2 had five, 17 had one rectal, and 5 had two rectals. The forceps were used fifteen times, 43 were noted as lacerated, and 14 ran febrile temperatures. Thus, though the forceps was used only one-third as often, though there were just a fraction over half as many lacerated, yet the incidence of morbidity was five times as great! (There were no deaths in either series.)

Since the above analysis was made, Dr. James Mayes, of Brooklyn, has reported a very much larger series of cases prepared with 4 per cent solution of mercurochrome, used both externally and within the vagina, and with a corrected morbidity of 3.26 per cent (460 cases). This is a very successful result and deserves careful consideration. It is a question still in my mind as to whether we should invade the vagina as a routine, with *any* kind of an antiseptic; also, as far as I am able to learn, mercurochrome has no advantage over tincture of iodine as a penetrating, effective skin antiseptic. It is quite true that mercurochrome is not irritating and iodine is. The patient should be at least *partly* under an anesthetic when the iodine is applied, so that if pain be complained of, a few inhalations will relieve her. I have never seen blistering of the skin occur and attribute this to the care with which it is applied, and to the early neutralization with alcohol.

One may therefore conclude that we have in either the iodine-alcohol, or the 4 per cent mercurochrome method of preparation of the genitalia for delivery, a procedure that is safer than any yet advanced; each is simple and can be used by any one who will take the trouble to have the solutions prepared shortly before expected delivery. The iodine-alcohol would seem to be the simpler of the two, as it can be used with effect as late as five minutes before delivery, whereas, the use of mercurochrome is advised at least one hour before any operative procedure.

OBSERVATIONS ON THE TREATMENT OF THE EDEMA OF THE TOXEMIA OF PREGNANCY WITH AMMONIUM CHLORIDE*

BY ROBERT D. MUSSEY, M.D., ROCHESTER, MINNESOTA

(From the Section on Obstetrics, Mayo Clinic)

EDEMA of varying degree is almost always evident in cases of pre-eclamptic toxemia, regardless of whether the toxemia is of the so-called true eclamptic or of the nephritic type. There is also a definite increase in weight, and usually a rise in blood pressure. In fact, a rapid gain in weight may be an early sign of toxemia.¹ The urine is decreased and contains albumin. A slight pitting of the ankles is usually accepted as normal in cases of pregnancy, but the pitting becomes pathologic when marked or when it appears elsewhere on the body.² Wieloch describes an insidious edema in which an excess collection of fluid in the tissues occurs before the pitting of edema is noticeable.

The term "preeclamptic toxemia," as commonly used, covers toxemia in which pathologic changes in the liver predominate, as well as the acute nephritis and acute nephrosis of pregnancy. Edema may occur as the result of preexisting nephritis. Such cases will be discussed in this paper, rather than those of edema due to cardiac decompensation or venous pressure in the pelvis. The pathologic cause of edema will not be discussed.

The edema of preeclamptic toxemia when marked and accompanied by hypertension and albumin in the urine is indicative of a grave condition. Headaches, dizziness, and finally eclamptic convulsions may occur, and the question of whether they are due directly to a toxin or to edema of the brain accompanying the toxic condition, may be disputed. It is a fact, however, that relief from the edema is accompanied by improvement of symptoms.

Similar clinical features obtain in cases of acute glomerulonephritis, a resemblance further strengthened by similar findings in the chemical examination of the blood, which is practically normal in both, aside from an increase in the retention of sodium chloride. The nonprotein nitrogen of the blood rarely shows any increase. On the other hand, the edema of chronic nephritis is usually associated with an increase of nonprotein nitrogen in the blood and frequently with the retinal changes accompanying chronic renal disease.

Improvement accompanying the reduction of edema has been noted by the internist in cases of acute nephritis and acute nephrosis, and by

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Hot Springs, Virginia, September 16-18, 1925.

the obstetrician in cases of the toxemia accompanying the edema of pregnancy. Relief from edema is secured by the removal of the excess fluid from the body, chiefly by increasing the urinary output.

Diuresis may spontaneously follow rest in bed, especially if the patient is on a diet low in water, salt, and protein. It may occur after venesection in the presence of marked hypertension, and is often associated with removal of toxic material from the bowel by catharsis or flushing the colon. Various drugs have been used for their diuretic effect.

Meyer and Cohn, in 1911, added a certain amount of calcium chloride to the food of infants and found that, owing to loss of water, their weight was decreased. Schultz, in 1918, gave 10 gm. of calcium chloride daily to patients with war nephritis, and in several cases noted prompt diuresis and loss of edema. Keith, Barrier, and Whelan have confirmed the work of others along this line, and have demonstrated the value of the use of calcium and ammonium chloride, and more recently ammonium chloride and novasurol in the production of diuresis in cases of nephritis with edema. They showed that following the daily ingestion of 10 gm. of calcium chloride or ammonium chloride, the urinary output was markedly increased. Coincident with the diuresis and lessened edema, there was increased excretion of sodium, mostly as sodium chloride. They assert that large doses of ammonium chloride cause acidosis and an increase of blood urea, and that great care should be taken in its use if the urea retention in the blood is considerable.

Ulrich reports the use of novasurol in a case of eclampsia with convulsions, marked edema, and anuria. The drug was used after other measures had failed to effect improvement and the patient's subsequent recovery was ascribed to the diuresis produced by the drug.

Last year findings in a group of patients with toxemia of pregnancy, whose clinical symptoms resembled those of acute glomerulonephritis, were reported.⁵ Following Keith's suggestion, I first used calcium chloride, and later ammonium chloride for their diuretic effect in a small group of similar cases. Calcium chloride was discarded because it is particularly distasteful, frequently causing nausea and vomiting. Ammonium chloride was given in tablet form until gelatin-coated capsules containing 1.5 gm. were obtainable. The drug was tolerated much better in the latter form, although in two cases its use had to be discontinued on account of vomiting. Its use, however, was generally followed by prompt diuresis, disappearance of edema, marked loss of weight, lowered blood pressure, and general improvement of the patient. In most cases the improvement was greater and more lasting than that obtained by dietary and other measures.

The patients under observation were kept at rest in bed. The daily diet was limited to 1500 calories containing 50 gm. of protein, with a minimum of salt, and 800 c.c. of fluid. In most instances before medi-

TABLE I
THE RESULTS OF AMMONIUM CHLORIDE IN THE TREATMENT OF THE TOXEMIA OF PREGNANCY

CASE	AGE, YEARS	PARA	GESTATION, WEEKS	PREPARATION, DAYS	MEDICATION		WEIGHT, POUNDS			EDEMA		BLOOD PRESSURE				AVERAGE DAILY URINE		BLOOD UREA, MG. FOR EACH 100 C.C.		CARBON DIOXIDE COMBINING POWER, PER CENT		REMARKS
					DAYS	AMOUNT, GR.	NORMAL	BEFORE	AFTER	BEFORE	AFTER	BEFORE	SYSTOLIC	AFTER	DIASTOLIC	BEFORE	AFTER	BEFORE	AFTER	BEFORE	AFTER	
1	32	II	26	25	11	110*	175	215	183.0	2	1	174	110	158	102	700	1050	18	28	47		Temporary improvement. Still fetus. Chronic nephritis (?)
2	42	IV	33	13	10	60	135	170	146.0	2	0	164	118	130	90	400	915	9		48		Improvement. Necessity of induction of labor delayed three weeks.
3	20	I	37	6	5	28	118	136	125.0	2	0	140	80	122	80	900	1000	28		50		Mild toxemia. Definite diuretic effect and improvement.
4	26	I	37	13	8	60	130	173	149.5	3	1	182	104	130	90	350	1380	32	30	42	28	Definite diuresis and improvement.
5	31	I	36	17	6	34	140	190	175.0	2	0.5	148	88	144	88	650	1080	31	24	47	34	Diuresis. Medication discontinued on account of vomiting. Induction of labor.
6	41	VI	36	11	6	54	180	208	191.0	4	0	204	108	170	110	450	1020	16	31	22	51	Diuresis. Slight delay of progress of toxemia. Induction of labor.
7	38	I	27	30	10	86	140	156	146.0	2	1	202	114	166	104	600	1100	19	29	49		Diuresis. Subacute nephritis Still fetus.
8	28	I	31	30**	11	110	121	165	116.0	4	0	182	118	128	92	350	1900	71	16	49	41	Postpartum medication. Marked diuresis and loss of weight.

*Calcium chloride.

**Includes postpartum hospitalization.

cation was started, the urinary output was observed for several days and the blood was examined for its urea content and alkali reserve. Up to 10 gm. of ammonium chloride were given by mouth daily, even after diuresis was effected, and if possible, until the edema disappeared. Usually a total of from 50 to 100 gm. of ammonium chloride was given. Following the disappearance of edema, the fluid intake was increased.

REPORT OF CASES

CASE 1.—The patient showed evidence of toxemia at the fourth month. She ignored instructions, returning at the sixth month with albumin 3, systolic blood pressure 186, and diastolic 128, edema 3, and weight 215 pounds (normal, 175 pounds). She remained in the hospital approximately twenty-five days. Her weight dropped 32 pounds, 19 pounds in the first nine days before the medication was started, and the systolic blood pressure fell to 158 and the diastolic to 102, with albumin 1. She left the hospital against the advice of physicians, and ten days later gave birth to a still fetus. Calcium chloride was used for two periods, the first for five days and the second for six days. Although a slight diuresis was produced, the benefit may be questioned. The patient has not since been observed, but a tentative diagnosis of chronic nephritis was made.

CASE 2.—Ammonium chloride was started on the fourth day, and a total of 60 gm. were given. The average daily output of urine before its use was 400 c.c., and during its use 915 c.c. The patient lost 5 pounds in three days prior to the treatment, 17.5 pounds during the seven days of treatment, and 1.5 pounds in three days after the treatment was discontinued. Three weeks after the patient's dismissal from the hospital, her blood pressure had risen to 150 systolic and 90 diastolic, with no edema, and there was albumin 3 in the urine. A living babe was delivered by cesarean section; three had been done previously for contracted pelvis. The patient recovered uneventfully.

CASE 3.—The patient was sent to the hospital in the thirty-seventh week of gestation on account of a sudden increase of the systolic blood pressure from 120 to 140, and the appearance of edema 2. Ammonium chloride was started on the second day and 28 gm. were given in five days. The loss of 9 pounds in six days and the slightly increased output of urine were no doubt partly the result of the medication. Labor was induced by castor oil and quinine at term, and a living babe was delivered.

CASE 4.—Calcium chloride was given at first but could not be retained. Ammonium chloride was started on the fifth day, continued for eight days, and during its use, the urinary output increased from an average of 350 c.c. to 1,250 c.c. daily, and the patient lost 20 pounds. She was dismissed from the hospital on the thirteenth day. Six days later she went into labor spontaneously and was delivered of a living babe. At this time she had no edema; her systolic blood pressure was 160 and diastolic 100 during labor, and the following day the systolic blood pressure was 118 and the diastolic 85.

CASE 5.—The patient had a rather abrupt onset of toxemia. Her normal weight was 140 pounds. At the thirty-second week of gestation her weight was 179 pounds with no albumin in the urine. Four weeks later she weighed 190 pounds, had edema 2 and albumin 2. She had an initial diuresis and loss of weight following the use of ammonium chloride. This had to be discontinued on account of vomiting after eight days when 34 gm. had been given. She had lost 15 pounds up to this time, but subsequently did not lose. Labor was induced on

the seventeenth day because of a sudden rise in blood pressure accompanied by severe headache.

CASE 6.—Ammonium chloride was started the day of admission and 54 gm. were given in six days. The average daily urinary output was 1,020 c.c., as compared to an average of 450 c.c. after the medication was discontinued. Loss of weight and disappearance of edema was followed by only a moderate fall in blood pressure which persisted around 170 systolic and 110 diastolic. On account of this and the onset of headaches five days later, labor was induced and a living child was delivered.

CASE 7.—The patient had subacute nephritis without marked edema. After she had been observed for a week, she was given ammonium chloride for two periods. In the first period, during which 46 gm. were given in six days, her weight decreased 10 pounds and the edema disappeared. After an interval of eight days on the same general treatment and without medication, she gained 10 pounds and the edema reappeared. Following another course of medication, during which 40 gm. were given in four days, the edema again disappeared. The blood pressure remained high, systolic 166, and diastolic 104; there was albumin 2 in the urine. During the following week the fetus died and labor was induced a week after the cessation of medication; the patient recovered slowly with a slightly increased blood pressure, systolic 132, and diastolic 86. This and a faint trace of albumin in the urine were the only indications of renal damage. Ammonium chloride had a definite diuretic effect in this case and seemed to ward off more severe trouble.

CASE 8.—The patient went into labor spontaneously six days after admission to the hospital. Previous to that time, her weight had remained at 175 pounds with an average daily urinary output of 350 c.c., and edema 3. The second day after confinement the weight was 165 pounds, with edema 2 and albumin 2; the systolic blood pressure was 182, and the diastolic 118; the day before labor it had been 176 and 120. In the next eleven days, 110 gm. of ammonium chloride were given with an average daily urinary output of 1,900 c.c.; the weight dropped to 116 pounds (a loss of 49 pounds); the edema disappeared, and albumin 1 was found in the urine. On the day after the patient's admission to the hospital, the blood urea was 71 mg. for each 100 c.c. of blood, and five days after the medication was started, the blood urea was 16 mg. for each 100 c.c. of blood. Her subsequent convalescence was uneventful, although she has a slight residual chronic nephritis.

SUMMARY AND CONCLUSIONS

The excessive increase in weight in cases of toxemia of pregnancy is usually due to retention of fluid in the tissues, which may not always be recognized as edema. The use of ammonium chloride in conjunction with rest in bed, restriction of diet and fluid intake usually causes an increased excretion of urine. The results obtained in this series of cases justify the continued use of ammonium chloride as a diuretic in similar cases. The increased excretion of urine and loss of edema with resulting loss of weight, probably carries from the tissues sufficient toxin to improve the condition of the patient. In several instances, the improvement was lasting, apparently enabling some of the patients to carry on until a living child could be delivered. The convalescence of the postpartum patient (Case 8) was unquestionably shortened, and probably more severe residual nephritis was averted.

The resemblance between the action of ammonium chloride in certain cases of eclamptic toxemia and cases of acute glomerulonephritis is rather striking. Although there is usually little or no increased retention of urea in the blood, ammonium chloride should not be used without examinations of the blood for urea and alkali reserve, as manifested in the carbon dioxide combining power.

REFERENCES

- ¹Davis, C. H.: Jour. Am. Med. Assn., 1923, lxxx, 249.
- ²Keith, N. M., Barrier, C. W., and Whelan, Mary: Jour. Am. Med. Assn., 1924, lxxxiii, 666-670.
- ³Keith, N. M., Barrier, C. W., and Whelan, Mary: Jour. Am. Med. Assn., 1925, lxxxv, 799-806.
- ⁴Meyer, L. F., and Cohn, S.: Ztschr. f. Kinderh., 1911, ii, 360-419.
- ⁵Mussey, R. D.: AM. JOUR. OBST. AND GYNEC., 1925, ix, 808-819.
- ⁶Randall, L. M.: AM. JOUR. OBST. AND GYNEC., 1925, ix, 529-535.
- ⁷Schultz, Erich: Ztschr. f. klin. Med., 1918, lxxxvi, 111-138.
- ⁸Ulrich: Deutsch. med. Wchnschr., 1923, ii, 885-886.
- ⁹Wieloch, J.: Zentralbl. f. Gynaek., 1924, xlvi, 898-902.

(For discussion see page 262.)

THE INTRAMUSCULAR INJECTION OF MAGNESIUM SULPHATE FOR THE CONTROL OF CON- VULSIONS IN ECLAMPSIA*

BY LEE DORSETT, M.D., ST. LOUIS, MO.

(From the Obstetric Department of the Washington University School of
Medicine)

MAGNESIUM sulphate was first used in experimental work for the control of convulsions by Meltzer, in 1899, and later, together with Auer, further experiments were made ~~upon~~ monkeys infected with tetanus, and these were published in 1905. Kohn and Straube confirmed the findings of the two preceding workers and used the drug for the control of tetanic convulsions in man. Following these investigators, Blake, Logan, Miller, Hessert, Kocher, Robertson, and others, published findings which agreed with Meltzer and Auer.

My attention was first called to the possibility of using magnesium sulphate hypodermically for the control of the convulsions in eclampsia, by a paper read by Smith and Leighton, of St. Louis, in 1923. They reported eight recoveries from tetanus in which this drug was used in conjunction with tetanus serum. Immediately after the reading of this paper we began using magnesium sulphate in eclampsia, and on November 9, 1923, I reported ten cases before the St. Louis Gynecological Society. Since that time Lazar, of Los Angeles, and Alton and Lincoln, of Worcester, Mass., have reported a number of cases in which they have used the drug. While the two papers dealt with the use of magnesium

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1923.

sulphate intravenously, we have given the drug intramuscularly only, believing that there is much less danger from any toxicity, and I believe that our results have at least been as good as theirs.

All of the writers herein mentioned have laid special stress upon the anesthetic and relaxing effect of magnesium sulphate, giving little, if any, attention to an additional, if not one of the most important effects of the drug, namely, the marked effect it has on the reduction of the intracranial pressure. This last point has been brought out very forcibly by two other men who were working along entirely different lines from the writers mentioned, Max M. Peet, of Ann Arbor, and Chas. E. Dowman, of Atlanta.

In the ~~thirty-eight cases~~ upon which this paper is based, we have used the drug by injecting it deep into the gluteal muscle, and have used it to the exclusion, practically, of all other forms of medication, such as morphine, veratrum viride, chloral, bromides, and luminal. None of these patients were bled, nor was there a spinal puncture done. Several of the patients were extremely violent, and while the magnesium sulphate stopped the convulsions, it did not seem to quiet them. We see no reason why morphine cannot be employed in the postpartum convulsions, but we did not use it as we wished to see how far we could go without its use.

We began using a 50 per cent sterile solution of magnesium sulphate, but changed to a 25 per cent solution as we feared the toxic effect of the drug. The solution we are now using was made especially for us by one of the large pharmaceutic houses, and is a triple crystallized, sterile, nonanhydrous solution, put up in 15 c.c. ampules. We have not been governed by the blood pressure or the body weight of our patient, when injecting the solution, and give as an initial dose 15 c.c. in the buttocks, and do not fear to give this same amount every hour if necessary, but it is seldom necessary to give it at such short intervals. We have been guided entirely by the frequency and severity of the convulsions and the general condition of the patient. There has as yet been no respiratory disturbance of any kind, but we have been prepared at all times to give an injection of 1 c.c. of calcium chloride intravenously, should our patient manifest any ill effects from the magnesium sulphate. Several of the cases have received as high as 100 c.c. of the drug within twenty hours without any perceptible reaction. In talking with Professor Auer in regard to the intramuscular injections, and the size of the dose we are in the habit of giving, it was his opinion that we could use this large dose because of the fact that the gluteal muscle into which we injected the magnesium sulphate is a very coarse, thick-fibered muscle, and that therefore the absorption is rather slow.

In regard to the action of the drug, it has been noted that the effect varies in different cases, but seems to have a much more rapid effect in those cases where the patient receives the injections early and has had

only a few convulsions. In several cases, we have noted that there have been no more convulsions after the first injection. In the majority of cases there is a marked relaxation of all the voluntary muscles, while if the patient is in labor there is absolutely no effect upon the uterine contractions, nor has it any effect upon the blood pressure or pulse rate. While there is no purgative effect noticeable, we believe that it has a diuretic effect, as in numerous instances our patients passed large quantities of urine within twenty-four hours after the beginning of the injections. The only other form of treatment that these cases received was the introduction of 60 c.c. of a saturated solution of magnesium sulphate into the stomach, for its purgative action, and in the majority of cases, the use of a hot moist pack.

While we do not claim that the eclamptic convulsions can be stopped by the use of magnesium sulphate, we are positive that they can be controlled, and that it most certainly aids in the more rapid recovery of the patient, and we are sure that it has been the means of saving the lives of a considerable number of our cases. All of the eclamptics are considered primarily as medical cases and are treated accordingly, and it is not until we have the situation well in hand that we think of the case as an obstetric one. Of these cases that were not in labor when first seen, labor was induced in all by means of the modified Vorhees bag. The method of delivery depended upon the indications presented, but in no case was delivery hastened, nor did we think it necessary to perform cesarean section. In all of those cases coming under our care where there was a living fetus present, we were able to obtain a living child upon delivery.

Among the thirty-eight cases treated, there were two maternal deaths; one patient died on the tenth day postpartum from a cerebral hemorrhage, having developed a hemiplegia the previous day. The second woman entered our service in deep coma, having had fourteen convulsions before the treatment was commenced. She never rallied and died within twelve hours. Of the fetal deaths, there were nine; four babies were macerated, four were premature, weighing under 1300 grams, and died within two hours. One death was inexcusable in that a high forceps was done against the consultant's advice, and the baby died in three hours from an intracranial hemorrhage, due to a fractured skull from poorly applied forceps. (This was a fullterm infant.) There was one pair of twins, both lived. There were twenty-nine primiparae, four para ii, two para iii, and two para iv. Labor began spontaneously in twenty-five cases and was induced by means of the bag in thirteen cases.

The average age of the patients was twenty-three years, the youngest being fourteen, and the eldest thirty-two years.

The statistics covering the number of convulsions in the different cases are rather indefinite, due to the fact that it was next to impossible

to obtain a definite history from the patient or her family as to the exact number of convulsions the patient had before coming under our care. The total number of convulsions and the number of convulsions before and after receiving the injections of magnesium sulphate differ so in each case that only a detailed report of each individual case will bring out these points. The figures for the time of the beginning of the convulsions are divided into antepartum, intrapartum, and postpartum, but in the majority of cases those patients who had convulsions during labor and after delivery showed marked toxemia, even before they had convulsions. There were twenty-eight cases in which convulsions began before labor set in, two cases in which convulsions began during labor, and eight cases that had postpartum convulsions. In a series of thirty-eight consecutive cases herein reported there were ten cases that had no convulsions after the first injection of magnesium sulphate. While the delivery of the patient has a very marked influence upon stopping the

TABLE I

CASE NO.	TOTAL NO. OF CONVULSIONS	CONVULSIONS AFTER HYPO.	CONVULSIONS AFTER DELIVERY
1	11	7	11
2	18	10	4
3	13	2	0
4	7	1	3
5	9	5	0
6	1	0	1
7	4	0	0
8	17	5	0
9	10	2	0
10	1	1	0
11	10	8	1
12	4	3	2
13	7	2	7
14	4	0	0
15	4	0	0
16*	1	0	0
17	9	1	0
18	3	1	0
19	8	3	8
20	6	5	0
21	4	3	1
22	10	6	7
23	16	2	16
24	6	0	0
25	2	0	2
26	3	0	1
27	6	3	0
28	14	4	0
29	5	1	0
30	3	2	0
31	1	0	0
32	5	4	0
33	7	1	0
34	8	2	2
35	2	1	0
36*	28	12	28
37	6	2	0
38	1	0	0

*Died

convulsions, we are of the opinion that delivery under any circumstances should not be hastened, and the fact that twenty-two of the cases had no more convulsions after delivery does not mean that the delivery of the patient is the only method by which the convulsions can be eliminated.

CONCLUSIONS

1. The intramuscular injection of magnesium sulphate in 15 c.c. doses will control the convulsions of eclampsia.

2. Fifteen c.c. as an initial dose is not toxic.

3. This method of treatment not only relaxes the patient but decreases the intracranial pressure by relieving the cerebral edema, stimulates diuresis, and aids in the diminution of the general edema.

4. Eclampsia is primarily a medical condition and secondarily an obstetric problem.

5. Any method for the hastening of delivery of the patient is not only unnecessary, but adds greatly to the morbidity of the case.

UNIVERSITY CLUB BUILDING.

(For discussion see page 262.)

THE PREVENTION OF STILLBIRTHS*

BY CALVIN R. HANNAH, M.D., F.A.C.S., DALLAS, TEXAS

(Professor of Obstetrics Baylor University College of Medicine)

THERE is no particular difference between the unborn babe and the newborn except in the mode of sustenance. There has been much publicity in matters of education relative to the preservation of health and life of infants, and these efforts should be as zealous in the conservation of the lives of the unborn babies.

The prenatal centers try to teach simple facts concerning pregnancy and the unborn child and deserve the unqualified support of our profession. The mother should be taught that habits of moderate daily activity, with the usual duties of everyday life and a diet of plain, wholesome food, are necessary for the development, nutrition, and growth of the fetus. The sphere of the prenatal center is unique, dealing with the prevention of complications and the supervision of nutrition of the unborn child. The causes of stillbirths may often be prevented if intelligent and systematic instructions are given to the parents.

Some of the most frequent causes of stillbirths are: syphilis, placental disturbances, disproportion between fetus and pelvis, malpositions, prematurity and postmaturity, accidents of childbirth, toxemia, and slovenly obstetrics.

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

Syphilis has its own record in the number of stillbirths and should be diagnosed and treated to lower this mortality.

Premature separation of the placenta, low implantation, and placental apoplexy are often unavoidable, and may terminate disastrously for both mother and fetus. The successful management of these cases of placental disturbance depends upon the attending physician, whether he be capable of coping with these serious situations. If he is not, and the environment is such that the best surgical technic cannot be employed, then arrangements to secure efficient obstetric service in a hospital should be made, so that the patient may receive every surgical advantage with competent assistants to prevent complications. It is known that the loss of blood from a prematurely separated placenta exacts a heavy toll on fetal life, and to prevent loss of life, this situation must be met boldly and rationally.

All pregnant women, whether apparently healthy or not, should have a complete physical examination early in pregnancy. Functional defects should be discovered early and corrected, and such treatments and operations should be made as will add to the safety of both mother and baby. Only by thorough examinations may we know the true physical condition of the pregnant mother and her potential fitness to give birth to her baby. It is necessary early in pregnancy to accurately determine the condition of the heart, lungs, kidneys, and other organs, and to diagnose and treat various infections of the blood. Tests of kidney function and chemical analysis of the blood should be made if there are indications. Chronic nephritis, that otherwise might not be recognized, may be diagnosed by this examination early in pregnancy, and thus prevent toxemia, a serious complication of pregnancy, which ranks high in the cause of stillbirths.

The inlet and outlet of the pelvis should be accurately measured early in pregnancy. Too often the measurements of the outlet are neglected, assuming that a knowledge of the inlet is sufficient. Occasionally we find that the obstruction is at the outlet, and at delivery, the fetus is crowded or dragged through because the outlet has not been measured, which is an index of careless and slovenly obstetrics.

It is as important to recognize the prematurity, maturity, and post-maturity of a fetus as it is to have a knowledge of the size and shape of the pelvis. The measurements of the fetus may be made as accurately as the measurements of the pelvis. Repeated measurements of the fetus develop judgment in estimating its size and maturity. The fetus and pelvis should always be studied in relation to each other, and not separately, as is frequently done. The mechanics of labor, together with a knowledge of the relationship between the fetus and pelvis must be known in order to intelligently conduct labor with little injury to the fetus.

Examinations to determine presentation and position, and measure-

ments of the fetus for maturity should be made often enough during the last six weeks of pregnancy to know that the condition of the mother and fetus is normal. Malpositions and postmaturity should be recognized before the onset of labor. Malpositions should be corrected; breech presentations should be converted into cephalic whenever possible; and a follow-up treatment instituted to prevent a return to abnormality. Ahlfeld's, Perret's, and McDonald's rules will diagnose maturity and postmaturity of the fetus if made with the same precision as is exercised in the diagnosis of a heart lesion, or in taking the measurements of the pelvis to determine its size and shape.

If the disproportion between the fetus and pelvis is such that delivery is impossible through the birth canal, then cesarean section is warranted; if the disproportion is moderate, the use of forceps may be required; while if the pelvis is moderately contracted, induction of labor and the delivery of a smaller fetus is the best and safest treatment.

Ordinarily, the induction of labor is not justifiable before the thirty-sixth week, or until the weight of the fetus is twenty-four hundred grams, its length forty-eight centimeters, and an occipitofrontal diameter of ten centimeters; the two latter measurements are usually in direct proportion to each other and are essential in determining the size of the fetus. When labor is induced much earlier, the chances of life for the fetus are lessened because the blood vessels are fragile, easily broken, and the fetus is unable to withstand traumatism. A premature fetus is susceptible to injury during labor and, as a protection, the cervix and perineum may be dilated, but the membranes should not be ruptured so long as they act advantageously. An unborn fetus is protected in its uterine environment by the placenta, which stands between it and many pathologic invasions.

The recognition and correction of malpositions should be made several weeks before the onset of labor; and a failure to do this results in the loss of thousands of babies annually. Whenever possible, breech presentations should be converted into cephalic by external version. This should be done about the eighth month, and quite often is accomplished without the patient being aware of it. Francis J. Browne,¹ of Edinburgh, has said that in breech extraction, brain injuries are far more frequent and severe than in cephalic deliveries. He further states that "the liability to cerebral hemorrhage in premature infants is the greatest at from seven to seven and a half months, still considerable at eight months, while at eight and a half months the liability would appear to be no greater than at full term. Further, no case of cerebral hemorrhage occurred in a full-time child in which delivery was a natural vertex." He further arrived at the conclusion "that the liability to cerebral hemorrhage in premature infants is sixteen times that of those at full time,—taking 3 per cent as the normal frequency of breech de-

¹British Med. Jour., 1921, II. 146; 1922, II. 596.

liveries, it is evident that the liability to cerebral hemorrhage in breech presentations is ten times that in vertex."

We are aware that extensive injuries in the tentorium of the brain occur more frequently from breech deliveries and forceps operations, and we know, too, that these injuries may occur in spontaneous and prolonged deliveries, yet we must recognize the fact that the prevention of stillbirths rests in the prevention of difficult labor, whether they be breech or vertex.

Occipitoposterior positions occur quite frequently in the average obstetric practice. The diagnosis of an occipitoposterior position is not always easy; however, the suggestive cardinal diagnostic point is the finding of the os high in the hollow of the sacrum. Occipitoposterior positions occur frequently in elderly primipara, in patients who have gained excessively in weight, in patients with postmature babies, and in patients who have contracted or moderately contracted pelvis.

In many instances, a gain of twenty or more pounds above the standard weight of the patient will cause complications with occipitoposterior positions and a delay in labor. If fat and superfluous tissue is stored up in the body, it is reasonable to suppose that some thickening and enlargement of the pelvic tissues and muscles will occur which will reduce the size of the pelvic canal.

The treatment of most cases should be conservative, with the administration of sedatives to relieve pain and obtain rest. This conservative treatment, however, should not be carried to the extreme and permit the patient to become exhausted before interference is made to convert the posterior into an anterior position. Buist's two towel method is an excellent treatment in securing anterior rotation. The theory of Buist's method is that as the contractions occur, the pressure on the back of the fetus is such as to cause it to rotate anteriorly. In my personal work, I have found Buist's method, together with the use of sedatives, to be an excellent procedure for the conservative treatment of posterior position.

In patients who have not gained excessively above their standard weight, the uterine contractions are more regular and of longer duration, and this tends to secure flexion and anterior rotation. Should flexion and engagement take place, and arrestment later occur, then manual rotation with forceps may be necessary. Probably in some cases version may be justified when the head will not engage. Occipitoposterior positions cause more difficulty at delivery than other complications because the mechanism of labor is not thoroughly understood by most physicians. The physician fails to diagnose the position and assist in the correction. Postgraduate courses in obstetrics, and better teaching in our medical schools will assist in relieving this situation by concentration in teaching the mechanism of labor. However, regardless of the method used, the obstetrician must be alert, he must

accept his responsibility and render service according to his own judgment and knowledge of the science of obstetrics. Fear and expediency should not influence him to resort to radical measures. He should be bold enough to assume command should nature falter, and, promptly, not hastily, terminate a condition which may become dangerous to both mother and baby.

A delivery through a normal size pelvis of a postmature fetus with excessive ossification of the fetal head is as hazardous to fetal life as a delivery of a normal size fetus through a contracted pelvis. When the date of parturition has arrived, which has been determined from the last menses and quickening, and the measurements of the fetus will diagnose its maturity, the termination of pregnancy should be considered. Labor may be induced in many cases with castor oil, and quinine, and should this measure fail, then the bougie or hydrostatic bags may be used. The most promising field in the prevention of stillbirths is in the prevention of complications of labor, and postmaturity.

Asphyxia is a symptom and in its treatment the probability of a brain injury should be considered. Sometimes the cord may be the cause of asphyxia, due to prolapse, either frank or concealed, or due to pressure of the symphysis on the cord when around the neck of the fetus. Asphyxia and death may also result from trauma, and infections of the placenta and membranes which may cause a disturbance of fetal circulation. Auscultation of the fetal heart should be frequent during labor, and especially is this necessary during the second stage. The condition of the fetus must be followed carefully in malpositions, especially breech presentations, occipitoposterior positions, and in prolonged labors. It is the slow and irregular fetal heart that indicates danger, while the increased fetal heart sound does not signify any particular complication.

The treatment for the prevention of asphyxia is in the correction of malpositions; the limitation of oxytoxies in normal labor; the relief of frequent and prolonged uterine contractions by the use of morphine and other anesthetics; an episiotomy, if necessary, releasing pressure on the brain, and, if indicated, the prophylactic use of forceps. The treatment of the symptoms of asphyxia should not be radical, but well-planned, with the execution of timely therapeutic measures for shock. After the delivery of the head, there is an interval before the next uterine contraction which expels the shoulders and body. During this period, attention should be given to the removal of mucus and blood from the nasal and air passages to prevent inhalation with the first respiration. If the physician does not attempt to stimulate uterine contractions during this period, but devotes his time to the cleansing of the nose and mouth of blood and mucus, much toward the prophylactic treatment of asphyxia has been accomplished. After delivery, the baby should be wrapped in a warm blanket, mucus and blood removed

from its mouth and air passages, and head lowered and well supported to prevent further injury. It is very essential that the baby rest. Attempts to stimulate respiration should be gentle, and not frequent. Massage over the chest and cardiac region may be made, but not roughly. Mouth to mouth breathing, with proper protection for the baby by sterile cloth, may be resorted to in desperate cases. Throwing the newborn over the physician's head, or the use of ice or cold water dip, are obsolete in the treatment of asphyxia. It is a thoughtless method to handle the baby roughly for resuscitation, and thus rob it of its last chance of life. The baby should be closely observed for several hours, and also during the next few days for symptoms of brain injury; such as, failure to nurse, drowsiness, twitchings, eye symptoms, convulsions, and, later, jaundice. If in doubt as to a brain injury, or if diagnosed, spinal puncture is indicated. If the baby has been injured, whole blood or other remedies to reduce the clotting time of its blood should be given. The child who has been injured at birth presents an economic problem which is of concern to both the medical profession and the general public.

Many unnecessary operations are done at delivery for insignificant reasons; however, an experienced obstetrician may interfere when necessary to reduce birth injuries and lower fetal mortality. Certain conditions arise which call for extreme measures, which, if left to nature to correct, would mean death to both mother and baby.

Toxemia of pregnancy is a preventable disease. Eclampsia may be prevented by proper hygiene; limitation of the diet to prevent excessive gain in weight over the standard weight; proper elimination; and adequate and intelligent supervision of the physician by giving instructions to the patient each week. Intelligent prenatal care will usually prevent toxemia of pregnancy, the cause of many stillbirths. If eclampsia should occur in a patient who is directly under the supervision of a physician, it usually may be considered as an indictment of the service of the physician, or the cooperation of the patient. The most competent teachers should teach normal obstetrics, and teach that eclampsia and its symptoms are preventable. The judgment of an experienced and well-trained obstetrician is needed, and his value is immeasurable in order that results may be obtained in preventing normal cases from becoming pathologic. Should early symptoms of toxemia arise, the patient should be put to bed that she may rest; the diet should be limited, decreasing the amount to nil if her condition warrants it; and the elimination should be increased. With this treatment, the symptoms of toxemia will usually disappear; however, if not, probably the patient may be carried until past the thirty-sixth week, when labor may be induced.

An unexpected delay in labor does not necessarily mean immediate

operative interference, but probably in many cases all that is necessary is rest and relief of pain for the patient.

The study of the causes of stillbirth indicates that the methods of delivery, as practiced by the average physician, should be improved. More clinics should be available for the doctors in general practice that they may be given the opportunity to correct their errors, improve their technic, and understand the mechanism of labor. The zeal for surgery has led many an unqualified doctor to operate, diverting the delivery from the vaginal route and substituting for it abdominal section. The problem of the prevention of stillbirths may be essentially solved by the medical schools, medical associations, and well-organized clinics having the primary idea of teaching students and physicians to become qualified for safe and competent work in obstetrics and to be able to skillfully manage a nonoperative labor.

During the last few years much attention has been given to the use of anesthetics to lessen pain during labor. The doctors in the rural districts are rapidly adopting measures for the relief of their patients. They are seeking assistance in educating and teaching rural women the necessity of reporting their pregnancy in advance of labor that they may have the opportunity to instruct these patients in antenatal care and thus materially lower the fetal death rate. Competent physicians should be sent into the rural districts to teach the essential facts of prenatal care and the symptoms which complicate pregnancy that the vision for a greater work in obstetrics in the prevention of stillbirths may be realized.

During the next decade, the greatest advancement in preventive medicine will relate to the care of the pregnant mother and the newborn infant. Stillbirths are largely preventable by prenatal supervision, and the only adequate treatment is in the relief of conditions which may cause death to the fetus. As a moral obligation, greater efficiency in obstetrics must be achieved that the immediate benefit of better health for the mothers of our country may be the result, and that the lives of the unborn babes may be saved.

(For discussion see pages 267.)

REPORT OF A CASE OF A MESENTERIC CYST*

BY EDMUND D. CLARK, M.D., INDIANAPOLIS, INDIANA

IN THE sixteenth century a Florentine anatomist, Benivieni,¹ described mesenteric cysts as "anatomical curiosities," and a few other writers of the sixteenth and seventeenth centuries reported cases of this condition. In 1803 enough cases had been reported so that Portal² classified them. Rokitsky³ (1842) is regarded as the first to describe chylous cysts of the mesentery. In 1886, Angagneur⁴ found that eighteen out of ninety tumors of the mesentery were cystic, and Bramann,⁵ in that year, reported the first case treated surgically; Kilian's case was reported two months later. Hahn,⁶ in 1887, gave a résumé of the subject and classified these cysts as blood cysts, serous cysts and echinococcus cysts. Arkion,⁷ in his Paris Thesis (1891), referred to 81 reported cases. In 1892, Bragneyhay⁸ added twenty-three cases to this number, making a total of 104 cases up to that date. Moynihan,⁹ in 1897, contributed a comprehensive article, in which he reported nine additional cases. In 1900, Dowd¹⁰ made a historical study of the literature of mesenteric cysts, and found records of 32 additional cases, making a total of 145 cases. Many of these cases, however, were not reported sufficiently in detail to make them really intelligible. In 1906, M. F. Porter¹¹ collected the literature on the subject of chylous cysts, and since that time a number of papers have been published reporting cases of mesenteric cyst, among them those of Niosi,¹² Colmers,¹³ Istomin,¹⁴ Heyerowsky,¹⁵ Chomsky,¹⁶ Benedict,¹⁷ Winslow,¹⁸ Shands,¹⁹ Carter,²⁰ Forster,²¹ and Pietti,²² who has contributed several articles on the subject. Recent authors agree in estimating that about 300 cases of mesenteric cyst, including all varieties, have been recorded in the literature. Of these the great majority were located in the small intestine, and only about 10 per cent of them were connected with the mesentery of the colon (Humiston and Pietti). Many more cases are being reported than formerly, and it is not at all unlikely that a clinical diagnosis of this condition will be made more frequently than has been the case in the past if surgeons in examining cases of abdominal tumor will bear in mind the possibility of mesenteric cyst. The condition is still sufficiently rare and difficult of diagnosis to justify the reporting of all cases.

In view of the supposed rarity of mesenteric cysts, it is of some interest that Dr. O. G. Pfaff²³ has reported two cases of this condition, the second before the American Association of Obstetricians and Gyne-

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

cologists, in 1905. At that time Dr. Pfaff stated that the fact that two cases had come under his observation within a period of a year and a half induced him to think that these growths might be more numerous than has generally been believed. The first of Dr. Pfaff's cases was a chylous cyst, which was enucleated. In the second case, as enucleation would have necessitated a difficult resection, drainage was instituted. Both of these cases made a good recovery. In the second case the cyst wall was examined, but the pathologist failed to find any trace of epithelium. Pfaff thought that underlying the apparent sudden development of these tumors could be found the fact that the mesentery allows such great mobility that the growing cyst may have been for years reposing in the pelvic cavity, and is only dislodged by the violence of some extraordinary exertion or accidental occurrence, which brings it for the first time into a position which forces its recognition by the patient or his physician.

Among the recent reports of cases of mesenteric cyst is that of Dr. Robert A. Milliken,²⁴ published in the *Journal of the Indiana State Medical Association*, December 15, 1924. In this case, which was diagnosed as an ovarian cyst, the omentum was found broadly adherent to the anterior abdominal wall at its edge, and a cyst was found in the mesentery of the terminal ileum, extending about eight inches up from the ilcocecal juncture. This case was treated by marsupialization and terminated in a good recovery. There was no recurrence up to the time when the report was published. In this case no histologic examination was made of the lining.

CASE REPORT

Mrs. E. C., aged fifty-one years, a housewife, married, was admitted to the hospital on December 29, 1924, because of a large tumor mass in the abdomen and rapid loss of weight.

Family History.—The patient had been married for nineteen years; no pregnancies. Her husband was living and well. Her father died of apoplexy at the age of eighty-seven years. Her mother died of pneumonia at fifty-three. She was the third of four children. One sister died of heart trouble at the age of sixty-four years. There was no history of tuberculosis, lues, or cancer.

Personal History.—The patient had never been in good health. She had had the usual childhood diseases, and also pneumonia when a child. In 1919, she had an attack of influenza. She had always suffered from chronic constipation which had become more marked during the last five years. Her pulmonary condition was normal, except for occasional colds. Her heart had always been weak, it was rapid and skipped beats. The patient stated that the heart condition became aggravated about four and one-half years ago following an abdominal operation.

Notes on the patient's history at that time are as follows: Five years previously the patient had an attack of pain in the left lower quadrant of the abdomen. The pain was not exceedingly sharp and was not associated with vomiting. She was in bed, however, for seven weeks. There was no leucorrhoea, but considerable dysuria. Shortly after this the patient noticed a growth, or "hardness" as she expressed it, in her abdomen. About two years previously she had had an attack of lameness

amounting to severe disability in her right leg, but this cleared up in about four weeks. She noticed meanwhile that the abdomen was increasing slightly in size. She then had another attack of pain in her right side and consulted her physician who advised her to come for operation.

Physical examination at this time showed a thin, pale woman. Examination of the head, heart, lungs, and extremities was negative. Palpation of the abdomen revealed a mass the size of a grapefruit, situated in the midline above the symphysis. There was distinct tenderness in the left side, but none in the midline. Vaginal examination showed that the mass was probably a uterine fibroid, about the size of two closed fists. There seemed to be some involvement of the left adnexa also. The blood count showed 7,000 white cells and 75 per cent polymorphonuclear leucocytes.

Operation was performed February 28, 1920. Under ether anesthesia, the abdomen was opened through a midline incision extending from the umbilicus to the pubes. The uterus was small and atrophic, situated a little to the right of the midline deep in the pelvis. The pelvis was filled for the most part by a firm, smooth, spherical mass occupying the position of the left ovary. There was some free fluid in the abdominal cavity. A supravaginal hysterectomy and left salpingo-oophorectomy were done in the usual way. The appendix was removed as an incidental measure and the abdomen closed in layers. The patient was in good condition at the end of the operation.

Present Illness.—About a year ago, before her present admission to the hospital, the patient first noticed a definite tumor mass in the form of a small "knot-like" affair in the right iliac region. Two months prior to admission there was a sudden increase in the size of the tumor, and since that time it increased in size alarmingly. The patient states that her loss of weight began four years previously, following the abdominal operation, and as before noted, she thinks the operation left her with a "bad heart."

Preoperative History.—Shortly after admission the patient developed an upper respiratory infection which finally involved the trachea and upper bronchi. This, and the heart condition (due to increased thyroid activity of mild degree) delayed operation until January 6, 1925.

Operation.—Operation was performed on January 6, 1925, under gas-ether anesthesia. Through a midline incision the tumor mass was exposed, which although in the pelvis, was not attached to the pelvic organs but was encased in the abdominal mesentery. The mass was about eight inches in diameter, rounded in form, and was in the mesentery of the transverse colon. Its mesenteric attachment was about three inches in extent; it was so intimately connected to the colon that it appeared as though it might be a part of that viscus. It was found however, that the tumor could be dissected free from the colon without seriously lessening the blood supply; therefore, it was not necessary to resect any portion of the bowel. After freeing the tumor from the colon, numerous bleeding points were ligated, and the site of the attachment of the tumor to the colon and mesentery was closed with running, interlocking, plain No. 1 catgut sutures. Careful exploration of the abdominal organs revealed no other abnormality. The abdomen was closed in the usual manner.

Postoperative History.—The patient was returned to her room in splendid condition. Postanesthetic nausea and vomiting were slight and had subsided entirely at the end of ten hours after operation. With the exception of slight gas pains and slight cough, which developed on the fifth day, convalescence was uneventful, and she was sitting up in a chair on the fourteenth day after operation. She was discharged from the hospital on January 30 in excellent condition. A letter received from the patient on September 24, 1925, reports her condition as good.

Gross Specimen.—The tumor measured 130 mm. in diameter; its weight was 3.5 pounds. Its attachment to the colon measured 60 mm. in length and 5 mm. in

width. The surface of the tumor was well supplied with blood vessels. There were cysts 20 mm. in diameter in the form of nodules on the surface of the mass. The contents of the cyst consisted of a yellowish, gelatinous material mixed with blood. The cyst was made up of multiple membranous cavities.

Microscopic.—The walls of the cyst were thin and composed of a cobweb-like deeply pink staining connective tissue, poor nuclei and moderately infiltrated with patches of small round cells, mixed with infrequent groups of polynuclears. Occasionally in the smaller cysts one made out an endothelial lining, but the larger cavities were quite uniformly bare. The blood vessels were numerous, large, and without walls except for the endothelial lining. Differential stains failed to show smooth muscle.

Etiology.—The pathogenesis of mesenteric cysts has not been satisfactorily determined. Histologic examination of cyst contents and tissues removed at the time of examination has failed to disclose whether the cysts are of embryonic origin or the result of degenerating lymph glands; whether they are ruptured or dilated lymph vessels or dilated lacteals, or whether they originate in the intestines. Most observers think the cause is a degeneration of the lymphatic glands, the efferent vessels being closed and thus giving rise to a retention cyst. The tumor grows between the layers of the mesentery, and may contain from a few drams to a quart or more of fluid. Carter²⁰ says, "There is no doubt that many, if not most, of these true cysts are embryonal in origin; others may arise from Meckel's diverticulum, or from sequestration from the bowel during development; also obstruction to the lymphatics or lacteals may result in cysts in certain cases." Porter and Moynihan believe that these cysts have a multiple origin. Benedict, who analyzed a series of 97 cases of mesenteric cyst, found them about equally divided as regards sex. They were found in patients of all ages, ranging from one to eighty years of age. In this series of 97 patients, 60 recovered, 14 died after operation, and in 12 cases the diagnosis was made at necropsy, sometimes after many years' duration and sometimes after death due to other causes.

Symptoms.—There are no signs or symptoms which are pathognomonic of mesenteric cyst. According to Porter, pain is more frequent with this condition than with any other type of abdominal tumor. A history of repeated attacks of abdominal pain associated frequently with vomiting, and often with alternating periods of diarrhea and constipation, is considered significant. These attacks, in Carter's opinion, are presumably due to increased peristalsis in an effort to overcome the narrowing of the bowel produced by the encroachment of the cyst upon the lumen of the gut; they may also be due to attacks of partial volvulus. Shands says that if the disease has any characteristic symptoms it is the presence of a cystic abdominal tumor, centrally located, and possessing an unusual degree of mobility. Carter agrees that these tumors are characterized by their extreme mobility, both laterally and also, to a lesser extent, longitudinally. This, however, does not apply to a tumor

completely filling the abdominal cavity. He points out further that the cyst is frequently surrounded by an area of gas-filled bowel, which gives a resonant note on percussion; occasionally a loop of bowel may cross the anterior aspect of the cyst, giving rise to a band of resonance surrounded by a dull area. The x-rays may be of diagnostic value in certain cases by showing the relationship of the tumor to the lumen of the bowel and the amount of narrowing from pressure.

There can be no question that the diagnosis of mesenteric cysts is difficult in view of the fact that no case has been recognized with certainty previous to operation or autopsy. Small cysts may give rise to no symptoms whatever. Under these circumstances, acute appendicitis, volvulus, intussusception, rupture of a peptic ulcer, cholecystitis, rupture of an ectopic pregnancy, in fact, any or all acute abdominal conditions must be considered, as any of these conditions may be so closely simulated that preoperative diagnosis is quite impossible.

Treatment.—The treatment of mesenteric cyst, as of any other acute abdominal condition, is operative. There are five operative procedures which may be adopted: (1) Aspiration; (2) marsupialization; (3) incision and drainage; (4) enucleation, and (5) resection of the bowel, if this viscus is affected, together with excision of the cyst.

Aspiration is mainly applicable in early cases. Drainage is usually employed after preliminary incision or spontaneous rupture. Marsupialization is indicated when the cyst cannot be readily enucleated or excised. A review of the cases in which this procedure was adopted showed that recovery usually followed. The mortality does not seem to be dependent upon the method employed, but rather upon the essential features of the case, or the superior advantages of modern surgery, especially with regard to sepsis.

CONCLUSIONS

1. Mesenteric cysts are still sufficiently rare to justify the reporting of all cases.
2. These cysts should be studied with relation to their attachment and the histogenesis of their enclosing membrane rather than from the standpoint of their cystic contents.
3. There is no symptom or set of symptoms which is pathognomonic of mesenteric cyst. They may be simulated by any acute abdominal condition. In their earlier stages these cysts are more mobile than most other abdominal tumors.
4. The treatment is operative,—aspiration, incision and drainage, enucleation and resection of the intestine (if necessary), or marsupialization.
5. The prognosis is good.

REFERENCES

- ¹Benivieni: Cit. from Niosi.
- ²Portal: Cours 'Anat. med., Paris, 1803.
- ³Rokitansky: *Pathologische Anatomie*, 1842.
- ⁴Angagnieur: *Tumeur du Mesentere*, Paris Thesis, 1886.
- ⁵Bramann: Quoted by Porter, *Ann. Surg.*, 1906, xliii, 380.
- ⁶Hahn: *Berl. klin. Wehnschr.*, 1887, p. 408.
- ⁷Arekion: *Tumeurs du Mesentere*, Paris Thesis, 1891.
- ⁸Bragnehay: *Arch. gén. de méd.*, 1892.
- ⁹Moynihan, Sir: (Berkeley), *Ann. Surg.*, 1897, xxvi, 1-30.
- ¹⁰Dowd, Chas. N.: *Ann. Surg.*, 1900, xxxii, 515.
- ¹¹Porter, M. F.: *Ann. Surg.*, 1906, xliii, 380.
- ¹²Niosi: *Virchow's Arch. f. path. Anat.*, 1907, cxc, 217.
- ¹³Colmers: *Arch. für klin. Chir.*, 1906, lxxix, 132.
- ¹⁴Istomin: *Kharkov. Med. Jour.*, 1910, ix.
- ¹⁵Heyerowsky: *Wien. klin. Wehnschr.*, 1908, vi, 185.
- ¹⁶Chomsky: *Surg. Arch. of Weljaminoff.*, 1913, xxix, 577.
- ¹⁷Benedict, A. L.: *Surg., Gynec. and Obst.*, June, 1913, xvi, 607.
- ¹⁸Winslow, R. C.: *Jour. Michigan State Med. Soc.*, 1915, xiv, 461.
- ¹⁹Shands, H. R.: *Southern Med. Jour.*, 1917, x, 484.
- ²⁰Carter, R. M.: *Surg., Gynec. and Obst.*, November, 1921, xxxiii, 511.
- ²¹Forster: *Beitr. z. klin. Chir.*, 1921, cxxiv, 116-138.
- ²²Pietti, E. C., and Humiston, C. E.: *Illinois Med. Jour.*, 1925, xlviii, 93.
- ²³Pfaff, O. G.: *Jour. Indiana State Med. Assn.*, 1905, v, 28.
- ²⁴Milliken, Robert A.: *Jour. Indiana State Med. Assn.*, Dec. 14, 1925, xvii, 417-418.

HUME-MANSUR BUILDING.

(For discussion see page 267.)

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

MEETING OF THE JOINT COMMITTEE, WASHINGTON, D. C., MAY 3, 1925

THE chairman, Dr. Fred L. Adair, presided and presented the following report:

During the past year the committee has had about two hundred dollars available for expenses; fifty dollars of which was received from the American Gynecological Society, fifty dollars from the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, and one hundred from the American Child Health Association. This amount has been expended for postage, stationery, and a small amount of clerical help.

An attempt has been made to get in touch with all the county, district, and state Medical Societies in the U. S. A. with the idea of stimulating greater interest in improving the conditions surrounding maternity and early infancy. To that end the following letter was sent to the secretaries of these different societies. These letters were all prepared, the envelopes addressed, and sent to the members of the committee, who forwarded them with, in some instances, personal letters inclosed to the various secretaries in the states which were assigned to the committee members. A copy of the letter is as follows:

Dear Doctor:

We are communicating with you as the secretary of your Medical Society because we feel that the conditions surrounding maternity and early infancy are not as good as they might be.

We feel that these conditions can be definitely improved with a lessening of the mortality and morbidity of mothers and infants. We are certain that medical men and organizations can do a great deal to accomplish this saving of life and preserving of health among the mothers and infants of this country.

It is our belief that the members of the medical societies should have their attention called to these conditions and that the programs of the meetings should include more papers and clinics on one of the fundamental but rather neglected branches of medical and surgical practice. It is hoped that in this manner the practice of medicine and surgery as it affects mothers and infants can be definitely improved.

We are willing to help you and others carry out such a program, and ask the earnest consideration of these points by your organization. We are willing and glad to assist in carrying out a program which is calculated to increase obstetric knowledge and improve the practice among the medical profession.

If we can assist in securing speakers for your society or help in any

other way, kindly notify one of the members of this committee who will be glad to be of assistance.

Dr. George W. Kosmak, New York City, N. Y.
 Dr. Henry Schwarz, St. Louis, Mo.
 Dr. George Clark Mosher, Kansas City, Mo.
 Dr. W. C. Danforth, Evanston, Ill.
 Dr. Frank W. Lynch, San Francisco, Calif.
 Dr. Robert L. DeNormandie, Boston, Mass.
 Dr. Ralph W. Lobenstine, New York City, N. Y.
 Dr. Fred L. Adair, Minneapolis, Minn.

All the states have been assigned to different members of the committee. The present assignment being as follows:

Dr. DeNormandie, Maine, Rhode Island, Massachusetts, New Hampshire, and Vermont.
 Dr. Danforth, Illinois, Indiana, Iowa, Ohio, Nebraska, and Wisconsin.
 Dr. Kosmak, Pennsylvania, Virginia, West Virginia, South Carolina, Mississippi, and Connecticut.
 Dr. Lynch, California, Arizona, Nevada, Oregon, Idaho, and New Mexico.
 Dr. Lobenstine, Delaware, North Carolina, New Jersey, Florida, New York and Maryland.
 Dr. Mosher, Michigan, Arkansas, Missouri, Kansas, Oklahoma, and Texas.
 Dr. Schwarz, Alabama, Colorado, Georgia, Kentucky, Louisiana, and Tennessee.
 Dr. Adair, Minnesota, Montana, North Dakota, South Dakota, Utah, Washington, Wyoming, and the District of Columbia.

Each committeeman is endeavoring to secure some prominent obstetrician in each state who will take charge of the program to develop better obstetric practice among the physicians of his state. The committee has not attempted to do any work with the laity but desires simply to reach the medical men and attempt by this means to improve the everyday obstetric practice. The committee realizes that the necessity for this is not equally great in every state but is of the opinion that each and every state presents situations which are capable of improvement.

The committee at this meeting, which was well attended (only two members being absent), decided to push on further with its activities. In order to develop this program certain resolutions were drafted for consideration by the constituent societies.

I. Resolved that the Chairman of the Joint Committee be directed to communicate with the Rockefeller and Carnegie Foundations for the purpose of securing for this Committee an annual appropriation to further its efforts to develop education in Maternal Welfare among physicians in this country according to its adopted program.

II. Inasmuch as considerable controversy has arisen in various quarters with reference to the theoretical education of nurses in hospital training schools, it is resolved that there be formulated by the Joint Committee on Maternal Welfare a uniform syllabus of lectures in obstetrics, which shall meet the essential and necessary requirements of this subject.

III. It is resolved that as a measure to promote better care of pregnant women, with a corresponding reduction of maternal and infant morbidity and mortality due

to septic infection in hospital practice, the Joint Committee on Maternal Welfare advocates a detached and separate maternity service with its own personnel in all general hospitals admitting pregnancy cases and also recommends as an ultimate ideal that physically separated buildings be provided for this purpose when practical.

George W. Kosmak, M.D.

Henry Schwarz, M.D.

George Clark Mosher, M.D.

W. C. Danforth, M.D.

Frank W. Lynch, M.D.

Robert L. DeNormandie, M.D.

Ralph W. Lobenstine, M.D.

Fred L. Adair, M.D., Chairman.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS

THIRTY-EIGHTH ANNUAL MEETING

HOT SPRINGS, VA., SEPTEMBER 16, 17 AND 18 1925

DR. ASA B. DAVIS OF NEW YORK, PRESIDING

Symposium on Appendicitis

Five Kinds of Chronic Appendicitis, by Dr. Robert T. Morris, New York City. (See page 180.)

Chronic Appendicitis Considered from the Clinical and Pathologic Standpoint, by Dr. Arthur E. Hertzler, Halstead, Kansas. (See page 155.)

Appendicitis in Pregnancy, by Dr. G. D. Royston, St. Louis, Mo. (See page 184.)

Right Rotation of the Appendix from Congenital Bands as a Factor in the Etiology of Appendicitis, by Dr. John H. Outland, Kansas City, Mo. (To be published in volume of Transactions.)

DISCUSSION

DR. CHARLES GORDON HEYD, New York City.—We must be surgical fundamentalists and accept much of the pathology of chronic appendicitis on faith. It seems to me, however, a mistake to visualize the appendix as a single isolated organ with a symptomatology of its own. We should rather view the infected appendix as an irritated viscus that interferes with the harmonious action of the entire gastrointestinal tract.

A number of years ago we had occasion to tabulate the so-called "cures" of chronic appendicitis by appendectomy. We were greatly surprised to discover that those cases in which the appendix was removed for simple, localized, right sided pain were not cured, but the cases that had appendectomy for symptoms referable to the upper abdomen and in which there was no demonstrable pathology in either the gall bladder or the stomach were almost invariably cured. We have long ceased to hold to the term chronic appendicitis. It was interesting in this tabulation to find that there was almost universally a history of a previous attack of pain which could be logically interpreted as an acute attack of appendicitis.

In any broad review of the symptoms of disturbed function of the gastrointestinal tract we must look upon the alimentary tract as a living, muscular tube. If there is a disturbance in the course of this tube manifestations of irritability occur above and below the point of irritation. Let us conceive that we have a rubber tube

filled with water and that we hit it a sharp blow in the middle. From the place of impact there follows a wave of impulse appearing at either end of the tube. In like manner if there is an infection resident in the appendix it represents a focal infection and may express itself in irritability of the colon below or the small intestine and stomach above. Many an irritable colon has been cured by an appendectomy, because the irritating focus at the juncture of the large and small bowel has been removed. The stomach and large bowel are essentially the mouth-pieces for disturbances of function in the course of the alimentary tract. Under normal conditions of health the movements of the gastrointestinal tube are below the threshold of consciousness of the individual. The muscular or mechanical function of the intestinal tube is independent of nerves and nerve centers, yet we have eight focal or nodal points throughout its course that are capable of modifying the intrinsic muscular movement of the digestive tube, just as the bundle of His of the heart determines the rhythm and regularity of cardiac action.

At certain points in the alimentary tract we find definite specialized collections of nerve tissue which Keith has described and which behave in every way similar to the nodal tissue in the heart. Four of these nodal points are definitely established and four others may be surmised with reasonable certainty. Seriatim they are: (1) at the junction of the pharynx and esophagus, (2) at the cardiac orifice, (3) just beyond the pylorus near the ampulla of Vater, (4) at the duodenojejunal flexure, (5) the ileocecal sphincter, (6) about the midpoint of the transverse colon, (7) the junction of the pelvic colon and rectum, and (8) within the anal ring. The muscular activity of the tube is dependent, therefore, upon an intrinsic rhythmic tone with autonomous contractility and hence the contracting of any portion of the intestine will depend upon its tone, conductivity, irritability and intrinsic contractile rate. All muscular activity is influenced, in a large degree, by the available blood supply. Inflammatory processes are associated with hyperemia and local cell life or the intrinsic metabolism of the cell is accelerated by near-by inflammatory processes and hence one would expect in any inflammatory condition in the region of the cecum an increase in the irritability of the small intestinal tract above the point of inflammation.

The appendix participates in muscular contraction as does the remainder of the intestinal tract and one may assume that the appendix must have a bowel movement the same as the intestinal tract and the inability of the appendix to discharge its contents into the cecum can be accepted as evidence of stasis with or without changes in the appendix.

The appendix stands in anatomic relationship to the upper abdomen in three distinct ways: (1) by continuity of peritoneal tissue, (2) by the canalicular association of the lymphatics, and (3) by direct transportation of material through the ever widening tributaries of the portal veins. The fact that the liver is interposed between the portal system and the general circulatory system, would result in the liver receiving the main insult from any deleterious material, biotic or chemical that might be absorbed or conducted to it by the portal system.

In the course of our studies on the liver in relation to chronic abdominal infection, we were surprised to note the frequent association of various degrees of hepatic change in the presence of chronic abdominal infection. We undertook to determine whether, in undoubted cases of so-called chronic appendicitis there was a definite and sequential change in the histology of the liver. A chronically infected appendix was construed as one that showed either polymorphonuclear or round-cell infiltration, together with varying degrees of fibrous tissue hyperplasia or obliteration by fibrous tissue replacement. The appendix, in the cases representing our study, was the only organ at fault, and was proved to be the cause of the symptoms of which the patient complained. All the cases were without gastrointestinal ulceration and without any demonstrable disease of the gall bladder.

We occasionally removed a section of the right and left lobes of the liver in

cases of undoubted chronic appendiceal infection. We found, on histologic examination of the stained liver sections, a uniform tendency toward the production of varying degrees of interstitial fibrosis. This fibrous tissue hyperplasia and replacement was preponderantly disposed in one group of cases about the periportal fields and in the other group of cases about the biliary fields. Clinically, the chronicity of the process in the appendix, and apparently the degree of infectivity and virulence were essential factors in the hepatic response. In the mildest type, the liver changes were represented in the irregular intermingling of fibrous tissue with the columns of liver cells, together with an infiltration in the newly formed connective tissue.

With regard to the course of the lymphatics from the appendix to the upper abdomen we can define a series of hyperplastic glands from the ileocecal angle up to the second portion of the duodenum. If we inject the lymphatics of the omentum, we will find the terminal distribution of the dye in the subpyloric glands just beneath the pylorus. So constant has been the finding of hyperplasia of the subpyloric glands in chronic appendicitis that we have been able to predicate a chronically diseased appendix by certain signs that are demonstrable upon opening the abdomen in the region of the pylorus. These gastric stigmas of the chronically diseased appendix may ordinarily be observed in the course of an upper abdominal laparotomy. The signs are distinctive and taken together predicate a diseased appendix. They are: (1) a tumultuous contracture of the antral portion of the stomach, (2) hypervascularization of the pylorus and antrum, and (3) hyperplasia of the subpyloric glands. These lymph glands are three to four times the size of the normal, pink in color, do not show bacteria on culture and invariably are hyperplastic, and (4) the finding of a thin, web-like membrane, much like a spider's web, thrown about the pylorus. These four distinctive signs we take to be the gastric stigmata of chronic appendicitis and we believe that they are always present in the so-called pyloric syndrome of chronic appendicitis.

DR. WM. EDGAR DARNALL, ATLANTIC CITY, N. J.—I believe there is a distinct relation between the rotation bands and adhesions and what we used to call chronic appendicitis.

Dr. Heyd has very clearly pointed out the difference between what is diagnosed as chronic appendicitis,—pain and rigidity in the lower right quadrant, and that other group of symptoms which affect the stomach and the gall bladder region. He has also stated—and I agree with him—that those cases that were operated upon for upper abdominal symptoms were almost invariably cured, and that those cases that were operated upon for simple pain and rigidity and some other symptoms in the lower right quadrant were not cured. My observation has been that most of these cases where we used to operate for chronic appendicitis because we found rigidity and pain in the lower abdomen, making a two inch or an inch and a half incision and taking out the appendix which seemed almost normal, were not cured. Is it the appendix that is at fault, or is it the type of patient? Nearly all of those cases, it seems to me, belong to that group of patients with prolapsed kidneys and stomach, upper rotation of the colon, Lane's kinks, Jackson's membranes, and Treves' bands. Several years ago I used to feel it my duty whenever I had a case of that kind to go very carefully over it, relieve all the intestinal stasis and clean up all the bands. In a number of those cases we got very good results; in some of them we did not, as the bands would reform in new locations, and the general abdominal ptosis still persisted.

But, as a matter of fact, it seems to me that the thing that we have been calling chronic appendicitis is not so much a matter of the appendix itself as an organ, because often those appendices after being removed seem to be almost normal, but it is the pain down the right side which is mixed up with certain types of adhesions and bands and folds, most of which I suppose are now considered congenital, and unless we can prove by roentgen-ray studies and other methods of observation just

exactly what we have there, simply taking out the appendix and not looking for obstructive folds and bands,—at least those that are making trouble,—will not give us satisfactory results. The patient will have just as much pain and discomfort and, in her own language, she feels that her appendix has not even been removed.

DR. LOUIS E. PHANEUF, BOSTON, MASS.—In connection with appendicitis in pregnancy, Dr. Royston has emphasized some very important points, namely, lack of abscess formation, and a tendency to general peritonitis. In the late cases we find gangrenous ruptured appendices, frequently with beginning general peritonitis because of this lack of localization. One measure which saves a number of lives should be mentioned, and that is the question of enterostomy, usually cecostomy, in connection with appendectomy. A purse-string suture of catgut is placed around the base of the appendix; the appendix is removed, flush with the cecum; a No. 28 French catheter is introduced into the opening, secured to the edge of the wound with a stitch of catgut, and the purse string is tied. A second purse-string suture is usually used to make the catheter more secure in the intestine. This catheter is allowed to come out through a stab wound, and the abdomen is drained by means of a cigarette drain through the primary incision. I was led to use this method after seeing five advanced cases of peritonitis following ruptured appendices in connection with pregnancy during my house surgeon days. All five women died of general peritonitis within a short time after operation, an appendectomy and drainage having been done. I have saved a number of lives of late years by resorting to a cecostomy; I probably have done ten such operations, the last one having been done within the last six months. The patient had a gangrenous appendix with beginning peritonitis and was six months' pregnant. An appendectomy and a cecostomy were done; the fecal fistula healed spontaneously in three weeks and she was delivered at term normally. All the other patients miscarried.

This operation permits us to do three things: control distention, drain the bowel, and put glucose solution directly into the bowel. With the introduction of glucose solution at intervals, after two or three days, a spontaneous bowel movement usually occurs, and the intestine takes on its normal function. I believe that in advanced cases this method has great value.

DR. STEPHEN E. TRACY, PHILADELPHIA, PA.—The first essayist told us we have five types of chronic appendicitis; the second states there is no such thing as chronic appendicitis. Doctor Heyd has demonstrated that removal of the appendix cures many patients of upper abdominal symptoms.

I would like to cite two cases which we have operated upon within the last week. One patient was between four and five months' pregnant, showed marked tenderness in the right side of the abdomen and the urine was loaded with pus. My associate made a tentative diagnosis of pyelitis and appendicitis and she was treated for nearly four weeks. On my return to the city, examination showed acute tenderness in the right iliac fossa. Cystoscopic examination showed the bladder to be normal. Cultures from the kidneys were negative and the urine was free of pus. We made a diagnosis of appendicitis and removed the organ. At operation the appendix was found injected, thickened and there were recent adhesions, not congenital bands, between the appendix and the wall of the cecum. The operation cleared up the symptoms. I would like to know how Doctor Hertzler would classify this case.

The second case I saw in consultation in May. She had a marked pelvic peritonitis. The pelvic organs were one solid inflammatory mass. One doctor who saw this patient two years before, claimed she had appendicitis at that time. Another doctor claimed she had pyosalpinx. We treated her conservatively until she recovered from the acute symptoms; discharged her from the hospital and recom-

mended that she return in September. At this time examination showed adherent appendages with an extremely sensitive point immediately behind the cervix uteri. It was then recommended that she be subjected to operation. When the abdomen was opened the fallopian tubes were found to be edematous and adherent, but patulous, and I believe they will fully recover. The appendix was adherent down under the edge of the sigmoid which was pulled to the right side, and at the tip of the appendix where it was adherent, there was a concretion about 2 cm. in length. The appendix was not injected except about the region of the concretion. I would like to know how Doctor Hertzler, would classify this case.

Doctor Royston gave us an excellent presentation of gestation complicated by appendicitis. We all agree with practically everything he said. There is no doubt that appendicitis in the presence of a gestation is a serious complication and the pathologic progress is extremely rapid in its development; just as it is in children. Therefore, I feel appendicitis during gestation is a surgical condition from the moment of its first symptoms. Our results of operations in these cases have been most satisfactory. I am inclined to believe that the high mortalities recorded in the literature are from the statistics of a time when the mortality in all classes of appendicitis was much higher than it is at present.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—Whereas the statement is given out broadly that chronic appendicitis does not exist, so I am teaching my internes that we have, specifically speaking, no such thing as acute appendicitis; that any man who operates should think pathologically, and that every time the appendix is diseased, no matter in what form, the entire organism more or less responds. I find that the liver is almost always affected in addition to the appendix, and when I say that there is no such thing as acute appendicitis I mean that the pathology is not local. It is a moving condition and every organ in the body responds more or less, generally the liver, sometimes there is a myocardia, often the spleen is involved. If we want to treat our patients properly, if we want to get the proper viewpoint to hand down, we should not operate for appendicitis alone, but ever keep before us the fact that it is a general pathology.

DR. JAMES E. DAVIS, DETROIT, MICH.—I think we can all conclude that the appendix is an organ of very great liabilities. One liability has perhaps not been emphasized sufficiently, namely, the decidual type of organ. Perhaps because of this very fact operators remove it, and for no other reason, just as the tonsils are removed and as teeth are removed. Any one who has worked in pathology will know that any number of tonsils are removed where there is no pathology present, and also that there are a great many appendices removed where there is no demonstrable pathology. Possibly the same is true of teeth.

Besides the decidual changes there are, of course, the changes due to infection. These have been sufficiently emphasized, but there is a liability to a particular type of change met with very frequently, namely, that of fecal stasis. As you routinely receive appendices for examination you are impressed more and more with the number that show only fecal stasis.

I cannot agree with Dr. Dickinson that there is no true appendicitis, because when there is fecal stasis or fecal concretions definitely obstructing the lumen of the appendix, a clear-cut local inflammation, gangrene, etc., may follow.

As to the chronic changes, there is no good and sufficient reason why we cannot have a chronic infection in this type of tissue just the same as we have chronic infection elsewhere. If you are going to rule out chronic infection here you should do it elsewhere. The difficulty arises in the recognition of what can be called a chronic change, and this is because it is a decidual type of organ. Very often this organ will undergo ordinary arteriosclerotic changes. The changes may progress quite rapidly and I see no reason why there should not be definite symptoms if the changes are very rapid.

As to the classification, the only way that I can see whereby we can reach safe ground is by correlation of the data concerning the case, which has been sufficiently emphasized. If this is not done, the pathologist surely cannot make decisions that amount to very much in those cases that may or may not be chronic changes, or that may be simply decidual changes. And again in the case of stasis there may be partial atrophy as a direct result of pressure from the static condition and which will give the same picture as the inflammatory changes. The other day I examined an appendix and felt sure from the gross appearance that it was an adenocarcinoma, but at the microscopic examination I was quite surprised to find a well-marked example of tuberculosis, with a great increase of the lymphoid tissue and the other classical conditions. I am very sure that the gross picture I had in this case and the picture we usually get in adenocarcinoma, might be said to be identical. This will point to one case where it was difficult to have decided this question upon arbitrary lines of diagnosis by the gross examination alone. We can only decide it after lines are drawn with careful correlation work in the clinical, gross, and microscopic examinations.

DR. MORRIS (closing).—Of the five kinds of chronic appendicitis that I mentioned, two are infective lesions and three are irritative lesions. Malignancy would make a sixth kind. That probably, however, does not belong to appendicitis as regards classification.

DR. HERTZLER (closing).—Referring to Dr. Heyd's remarks, I would suggest that some degree of caution is required in accepting his findings. Such groups of cells have been repeatedly described and ascribed to various causes. They are found in persons dying from accidents.

DR. ROYSTON (closing).—I must plead guilty to Dr. Hertzler's charge of making a diagnosis mainly on the presence of localized tenderness. Often the magic touch in the diagnosis of appendicitis is most helpful, in fact, essential. I do not believe that we should wait for symptoms referable to the upper abdomen. The very tender localized spot in the right flank is, I think, the only symptom of practical value so far as appendicitis in pregnancy is concerned.

Symposium on Placental Pathology

Case Report of Prolapse of the Placenta, by Dr. M. Pierce Rucker, Richmond, Va. (For original article, see p. 189.)

Treatment of Placenta Previa Based on 303 Consecutive Cases at the Boston Lying-In Hospital from 1895 to 1925, by Dr. Foster S. Kellogg, Boston, Mass. (For original article, see p. 194.)

Inversion of the Uterus, by Dr. Louis E. Phaneuf, Boston, Mass. (For original article, see p. 171.)

DISCUSSION

DR. JOHN O. POLAK, BROOKLYN, N. Y.—Dr. Kellogg's figures were most impressive and bring us back to a consideration of the conditions that determine the plan of treatment in any case of placenta previa. Basically every case of placenta previa must be considered as to the period of pregnancy. What one will do in placenta previa at five months or six months, one cannot do at term. Then the amount of blood lost tells something of the condition of the patient. Third, the condition of the cervix: a primiparous cervix presents a different condition to the

multiparous cervix. Again, the amount of dilatation of the cervix and the amount of effacement determine very materially what is to be done.

We have been treating with very good success our cases of partial placenta previa by waiting and vaginal packing, and the mortality has been reduced far below what we have had with bag introduction or bipolar version. Where there is an area of bleeding uterus alongside of the placenta, control of bleeding follows rupture of the membranes and firm packing and these patients will deliver spontaneously.

The next consideration is the presence or absence of sepsis. I agree that these cases die from rupture of the lower segment of the uterus, due to the trauma, shock and blood loss. Those that survive the sepsis, may die later from embolism.

We turned over all of the placenta previa cases in three services to one man some few years ago, and he did podalic version in every case (63) with two maternal deaths. That was the best record we have ever had and we have not been able to duplicate it.

I am thoroughly in accord with the doctor in regard to cesarean section in these cases of central placenta previa where there has not been a great amount of blood lost, where the patient is in good condition, and particularly in the primiparous cases or in the multiparous where the cervix is in good condition. Nothing is more alarming than the amount of bleeding that one can have in a central placenta previa with slight disturbances. This was brought home to me recently. I was called in consultation by one of my former students to see a case of placenta previa with twins. She had had her initial hemorrhage, had been in bed for several weeks and was being nursed along. She had another hemorrhage and he became frightened because her hemoglobin had dropped. The picture was typical of a twin pregnancy and the story was perfect. I looked very wise and said that she ought to be delivered and I would suggest delivering her from above in this particular case. He asked if I was not going to examine her and I said, "Well, it won't do much damage to slip a gloved finger in the rectum." I did it and I had a deluge. The point is that the history is the diagnostic point. Then, in the second place, never in a case of placenta previa make an examination unless you are prepared immediately to take care of your patient.

In the marginal cases that are in labor with an effaced cervix, the bleeding stops the moment labor pains stop. If we simply pack and let them alone we will be surprised to see how many of them will deliver spontaneously. But a cesarean section on a potentially infective case or on one that has been packed or on one that has lost a large amount of blood is dangerous. You should transfuse the patient and then section her, and it is surprising how the uterus contracts down and does not bleed after cesarean section. A few will have to have hysterectomy performed, but those are the few that are potentially infected.

DR. MILES F. PORTER, FORT WAYNE, IND.—I should like to emphasize the importance of deferring transfusions, infusions, etc., until after the possibility of a recurrence of the hemorrhage had been effectually overcome. To transfuse an individual with a ruptured uterus or something similar,—increasing the blood pressure before you have stopped the gate out of which the blood is flowing, is not under ordinary circumstances a logical procedure, and it is a dangerous one.

I would like to emphasize another point. It is not necessary to insist on a diagnosis prior to the institution of treatment. The death rate, for instance, in obstruction of the bowels remains about the same it has been for years, and 10 per cent of that death rate is due to delay, and practically all the delay is due to a desire to make a diagnosis. There is an acute lesion present, a woman likely to die of hemorrhage, and it does not make any difference whether the uterus has ruptured or not. The only thing is to give the proper treatment and

learn what you can after the cure has been made. All she wants is a cure and not a diagnosis.

I should like to corroborate what the last speaker said regarding the relative safety to both mother and child of cesarean section in these cases of placenta previa. So far as the child is concerned, there is no method any freer from danger and the mother's chances of getting well are more than ordinary. But you cannot prove this at the hands of any one man and we must apply that method of treatment that is best suited to the case we have on hand at the time.

DR. M. A. TATE, CINCINNATI, OHIO.—I desire to remind this Society that some twenty-four years ago the late Dr. Zinke read the first paper that was ever published on the treatment of central implantation of the placenta by cesarean section. At that time a terrific storm of criticism arose and no man was more abused for taking such a stand. Today the profession at large is almost unanimous that the best treatment when the placenta is centrally situated is a cesarean section.

DR. G. D. ROYSTON, St. Louis, Mo.—Central placenta cannot be diagnosed until there is advanced dilatation and if operation is done when the patient first begins to bleed, it will be done on many cases that might be controlled easily by packing.

I would like to ask Dr. Kellogg why they do the bipolar version, when we realize that the after-coming head is larger than the breech alone, and if we have one leg up alongside the breech we have in that case a larger dilatation, and by bringing down one leg we can control the hemorrhage satisfactorily and are less likely to injure the after-coming head than in cases where both legs are brought down?

DR. E. J. ILL, NEWARK, N. J.—The technic of reducing an acute inversion of the uterus seems relatively easy. I happen to have seen quite a few of these cases, the last two years ago. It occurred to me that the method I had long ago suggested for the reduction of an intussusception of the bowel might do to reduce the uterus. We know very well that in reducing a bowel we cannot pull at the end for if we do we tear the bowel, but if we put both hands beyond the tumor and keep on compressing the distal end of the intussuscepted bowel, reduction is made comparatively easy. The same holds true with the uterus.

The patient I wish to speak of had had several attempts made at reduction by a very competent obstetrician. He failed from below. I saw this woman on the twelfth day. I opened the abdomen and asked the doctor to push his hand up against the uterus so as to steady the organ. I introduced two fingers from above until they were beyond the constriction. Then one hand was placed behind the mass and the other in front and the fingers firmly brought together below the fundus so as to force the mass upward. That method has succeeded in every case where I have tried it. This woman had a baby since without any further difficulty.

DR. WILLIAM PFEIFFER, BROOKLYN, N. Y.—We should remind ourselves that after version or any other attempted method delivery should be spontaneous. It is the haste that tears the uterus, and the number of ruptured uteri with placenta previa should be very few.

DR. JAMES E. DAVIS, DETROIT, MICH.—I wish to speak of two cases. In one there was a small laceration just above the internal os which caused the death of a multiparous patient who was delivered in about six and a half hours without any accident whatever. In fact, she delivered herself, but she began to bleed immediately after the third stage was completed and continued to bleed, in spite of all efforts put forth to control the bleeding, for a period of about one and a half hours and then died. In this case the packing did not stop the hemorrhage because it did not reach the small area of laceration which was not more than 3 cm. long as shown at the autopsy.

The other case was one of complete inversion which I saw about eight years ago. The uterus was reinverted by manual manipulation and without any incident at all in the recovery. The patient had only a very slight degree of sepsis. The restoration of the tonicities of parts was good and in about two years patient had another baby without accident. The cause of the inversion in this case was due to two men pulling, one behind the other, in a brutal effort to deliver the child.

DR. RUCKER (closing).—There have been sixty-three cases of puerperal inversion reported since Evans' last paper about three years ago and it is interesting to note that if you divide those cases into group one, those that were delivered in the hospital; group two, those cases delivered in the home by physicians; and group three, those delivered by midwives, the mortality in group one is zero; 12.5 per cent in group two; and 36 per cent in group three. The whole question is the question of the prompt treatment of shock and if necessary, transfusion of blood.

There is one other factor, namely, the choice of anesthetic in these cases. Dr. de Gaudino, in South America is the only one I know of who has used novocaine spinal anesthesia for the reduction of the inversion. She had prepared her patient to do a Spinelli operation but under the spinal anesthesia, the cervix relaxed so much that she was able to manually reduce the inversion. Technically sacral anesthesia gives you the relaxation that is necessary, without the risk of an intradural injection.

In regard to Dr. Porter's suggestion, a premature separation of the placenta is a different proposition. You may get a prolapse of the separated placenta occasionally when the presenting part does not keep the placenta from prolapsing but usually prolapses are complications of placenta previa. A curious thing about it, is that when the placenta is normally implanted and prolapses, the cases reported have not given the classical symptoms of a premature separation of the placenta.

DR. KELLOGG (closing).—The inversion of the uterus cases as we have seen them in consultation were about thirty-six, forty-eight or seventy-two hours old. I am convinced from the cases that I have seen myself and from the experience of my colleagues that manual replacement of the uterus from below is only applicable to cases of inversion discovered immediately after delivery. I am equally convinced that the Spinelli and other cutting operations from below are only applicable to late cases weeks or months old of chronic inversion. I believe the operation of choice in the usual cases seen after some hours is to open the abdomen and replace the uterus by a procedure I have never seen described. This method is as follows: with an Allis clamp the inverted portion of the uterus and broad ligament in the neighborhood of the two is seized and firm traction made. This traction raises some of the inverted tissue with another clamp placed along the tube. The process is repeated and so on over and over again. At length one cornu of the uterus pops out and as it does so the other one slips out itself. This leaves the question of what to do with the uterus, and whether to lightly suspend it, let it alone, or do a hysterectomy on it since most of the cases run some temperature. I should like to have Dr. Polak's opinion on which of these three methods is the best.

Regarding the question of transfusion in placenta previa. In a certain number of cases a hemorrhage has to be stopped temporarily and the patient gotten into condition to deliver subsequently. In that case transfusion before complete control of the hemorrhage seems to be necessary.

As to the question regarding bipolar version, perhaps we used that term wrongly. We used it synonymously with Braxton Hicks' version. When there is two fingers' dilatation the foot is brought down and it is usually technically difficult enough to get one without trying to get two, and in addition the theory of

the treatment is that a half breech is a better tamponade against the placenta than would be the case if you brought down both feet.

Regarding spontaneous delivery in placenta previa, the fact is that there should be few deaths from ruptured uterus. I tried to emphasize in my paper that that is what we felt and we have made every effort to make these cases wait. But there is evidence from Johns Hopkins and in over 50 per cent of our own cases that as far as bags go you do not get full dilatation nor normal delivery. There is the added evidence that in a long series of cases the breech is so small in these premature babies particularly, that you do not get the necessary dilation for the head and the patients do not deliver themselves spontaneously. It is true that theoretically there should be few deaths from ruptured uterus but my discussion was that practically half the deaths resulted from that cause.

Regarding the diagnosis of a complete placenta previa not being possible until after some dilatation, practically every placenta previa that I have seen or that the records showed in this rather long series of cases, was admitted dilated two fingers and if you have nothing but placenta presenting with an actual two fingers' dilatation, it is safe enough to say that one is dealing with a complete placenta previa.

DR. PHANEUF (closing).—In answer to Dr. Rucker's question as to the inertia of the uterus, that may be a very much abused term, but it was said to be present in all of the cases which I looked up in the literature when preparing this material. Whether or not it was present in the case that I reported I do not know, as I was not present at the delivery but the attendant made a note in his record that it existed.

The question of anesthesia is necessarily a personal equation. The Europeans are much in favor of spinal anesthesia. I personally am afraid of this because in a period of ten years I have lost two cases of vaginoplastic operations and both died of cerebral hemorrhage following spinal anesthesia. All done under ether recovered. If spinal anesthesia will give enough relaxation to reinvert the uterus, it seems to me that ether anesthesia will do as much and in my opinion is less dangerous.

The question of transfusion was very important in this case. I feel that the woman would not have lived had she not been transfused shortly after the accident was discovered. She was in sufficiently good condition to stand the operation when she came to me, without further transfusion.

Symposium on the Mechanics of Labor

Indications for Cesarean Section, by Dr. Budd Van Sweringen, Fort Wayne, Ind. (For original article, see p. 201.)

The Occiput Posterior, by Dr. Percy W. Toombs, Memphis, Tenn. (For original article, see p. 206.)

The Relation of the Physiology and Mechanics to the Management of Labor, by Dr. W. A. Fowler, Oklahoma City, Okla. (For original article, see p. 212.)

Preparation and Treatment in Labor: Preparation of the External Genitalia for Labor, with Iodine-Alcohol. Report of 100 Cases so Treated, with Bacteriologic Results, by Dr. Burnley Lankford, Norfolk, Va. (For original article, see p. 219.)

DISCUSSION

DR. J. O. POLAK, BROOKLYN, N. Y.—In obstetric practise of today, I believe that there is no place for high forceps on account of the high fetal mortality that results from this method and which is uncontrollable.

With regard to widening the indications for cesarean section, I want again to stress the fact that there is a definite operative mortality from cesarean section, higher than from ordinary abdominal section. An operator may do a hundred abdominal sections, we shall say, for fibroid without the loss of one patient. One may even do six or seven hundred and have a mortality at the end of about 1.5 per cent. There is no one who can do a series of 200 or 300 cesarean sections who will not have a mortality of 3 or 4 per cent. There is a mortality that is absolutely uncontrollable. Consequently in widening the indications for cesarean section one must do so with a great deal of judicial thought.

I understood the Doctor to say that the majority of ruptures in the reported cases were in the lower section of the uterus. In all the statistics that I have ever studied they have been in the upper segment of the uterus. I agree that it is the position of the incision and the aseptic healing that determines the result: If one makes the incision in the median line low down in the uterus, rupture is less likely. DeLee told me only recently that in his experience rupture in the low operation in recurrence of pregnancy had never occurred. I know of no ruptures following the low operation. That rupture does occur in about 4 per cent of the cases where the high operation has been done there is no question.

Mention was made of operating on a patient by cesarean, who had previously had a drainage procedure on the supposition that adhesions would take place. A most amazing thing to all abdominal surgeons is to find that after a suppurative appendix where the abdomen is full of pus, if we simply incise the abdomen and put in a drain, and open the abdomen again years afterward, we will find no adhesions anywhere. It is the clean case that forms adhesions rather than the suppurative case.

About 75 per cent of all the cases of labor are posterior in the beginning, but rotate spontaneously in the vast majority of instances. They divide themselves into two classes. Those that engage will rotate and deliver if we give them time. In our recent analysis of 2,000 cases of occiput posterior, covering a period of something over ten years, 96 per cent of them rotated spontaneously; the incidence of forceps was 23 in a hundred; and the fetal mortality was 4.2 per cent. Now if that can be done by letting the case alone, favoring rotation by posture, giving the woman sufficient time, keeping up her resistance, giving morphine and scopolamine from time to time and employing forced nourishment, it seems to me that manipulation is unnecessary. I believe Potter has contributed something to the treatment of occiput posteriors that do not engage. If the pelvis is ample these are better handled by version, after the method of Potter. The real point in posterior occiputs is that we can do a great deal by posture. In my private practice I teach the patient to use the knee-chest position, beginning very early in pregnancy and continuing right straight through, as an exercise. And I have my nurse demonstrate to them just how they shall do it and she has them come in every two weeks to see whether they know how to do it, and we have found a surprising number of cases that have been occiputposterior rotate anteriorly in the course of the latter months of pregnancy as a result of routine knee-chest position. The lateral prone posture during labor, with the woman lying on the side toward which the occiput points, increases flexion and as soon as occiput gets into the brim of the pelvis it will take care of itself, if the patient has good pains. In the occipitoposteriors that present and reach the pelvic floor as such, it is a conservative process, for nature has adjusted the head in that way with the bipartur diameter which is narrowest coming under the narrow pubic arch first.

These cases only occur in funnel pelves, hence it is better to deliver them as posteriors than to attempt to rotate them. We will have less laceration, at least that is my experience.

With regard to the preparation before labor, we have been testing out this alcohol-iodine method in one delivery room and mereurochrome in the other for a period of a year and a half and our morbidity is a little less in the mereurochrome cases, even when numerous vaginal examinations are made. I believe if we use soap and water alone we will get about as good results.

DR. ASA B. DAVIS, NEW YORK CITY.—During the past thirty-five years in the Out-Patient Department of the Lying-In Hospital we have confined something over 85 000 women. In that time very little change has taken place in the preparation for delivery. The external genitals and neighboring region are cleansed with green soap and water and then freely bathed with a solution of bichloride of mercury one to two thousand. Several years ago a number of our attending staff conceived the idea that bichloride or any other antiseptic used for this purpose could be dispensed with to advantage. The matter was taken up at a full staff meeting and discussed; and it was agreed to give this plan a trial for one month. Very soon it was noticed that minor sepsis and morbidity began to appear in our Out-Patient Department, and by the end of the trial month there was a unanimous vote that we should return to the use of bichloride solution. This has been continued up to the present time with good results. The Out-Patient Department rivals the In-Patient in the matter of morbidity and complications.

DR. G. D. ROYSTON, St. LOUIS, Mo.—I have found the occipitoposterior position in about 75 per cent of cases examined early in labor. Those that come down, with practically normal pelvic measurements, where the head stays in the mid-pelvis, are the ones that become difficult.

We have not found that posture made any difference, for sometimes they will rotate and sometimes they will not. The thing that we have found of most value in having them rotate satisfactorily is to have the head well flexed. If the small fontanelle is most dependent, it will rotate anteriorly and if it is not the most dependent part frequently the occiput will not rotate anteriorly. Rotating these heads with forceps is, I believe, a bad procedure.

DR. J. W. POUCHER, POUGHKEEPSIE, N. Y.—Speaking of the indications for cesarean section, I would like to give an experience with two cases. A young woman was sent from a country town into the hospital on account of a transverse presentation. After labor began, by rectal examination I made out a shoulder blade presentation and advised section, which the patient was prepared for, and upon higher incision, which I always make, I found a placenta presenting. I delivered the child and found a cord about three and a quarter inches long. Patient made a good recovery.

Several years ago I had another rather trying experience with the same sort of location, although in this case we had a normal presentation, normal pelvis, and a young patient. I was called in after the patient had been in labor several hours, on account of the condition of the mother. She was becoming weak and with every severe pain she was nearly collapsed. Of course, I advised delivering her immediately with forceps. Examination showed a head low down, on the first traction I made the patient collapsed, stopped breathing. I stopped, took off the forceps, resuscitated the mother, then put the forceps on again. There was a second collapse, and when the third collapse occurred I delivered the head and shoulders and still found there was something detaining delivery. At that time I made a diagnosis that the cord was short and thick, but I continued delivery until I got the cord down where I could put a clamp on, and then the delivery was easy. The mother

made a good recovery but the baby died the next day on account of some injury done through traction on the cord.

These cases seemed to warrant a diagnosis of short cord as the cause of a transverse presentation which persisted. Of course, not every case that does not have the head engage in the pelvis should indicate cesarean section, but I merely bring these two cases out in this discussion for a fine healthy baby was lost because we did not know what the indications were.

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—In occipitoposterior cases, especially in multipara, we often find it of advantage, especially when the uterus is not exactly in the midline, to place the uterus in the midline and strap it there with adhesive plaster then using the postural method to favor rotation. I have preferred the position opposite to the one to which the occiput is directed; that is, in the right occipitoposterior the patient is placed upon the left side instead of the right. I had several instances only lately in which, while making preparations for a forceps delivery the patient was placed in this position and rotation occurred. In multipara, with a history of previous difficult labors, I often find an occipitoposterior position with a cervix fully dilated but thick and edematous and the occiput not descending. In such cases I put the patient under full anesthesia and deliver by version.

With regard to the diagnosis of occiput posterior, the fetal heart sounds are heard in the flank—the right flank in right occipitoposterior. They are also heard in this location for a left occipitoanterior, but the fetal heart sound of an occipitoanterior is never heard in the right flank.

As regards the preparation of the external genitalia for labor, we take the stand that the vulva should be shaved and not clipped. I am not very much in favor of either an iodine preparation or mercurochrome. Where not only the hand but the arm passes through the vulva, up to the top of the uterus,—I refer now to version—thorough cleansing with green soap irrigation, has been in my experience followed by little or no elevation of temperature and I believe consequently that such preparation is quite efficient. It is well known that in the antiseptic era we douched the vagina as a preparation for labor and then found that our morbidity increased, and in consequence we learned to let the vaginal tract entirely alone. What we may accomplish by painting the external genitalia with iodine, which is more or less irritating, or mercurochrome, I fail to see.

DR. WM. PFEIFFER, BROOKLYN, N. Y.—We know that most right-sided positions are posterior and if we make our abdominal examination thoroughly, we hardly need an examination through the pelvic outlet, rectal or vaginal, to confirm it. The only thing needed is to feel the location of the sagittal suture, and that can be easily done through very little dilation. If the fetus is on the right side the only conceivable positions are the O. P. or the R. O. A. or R. O. T. In other words, the bisacromial diameter and sagittal suture will remain at right angles, or nearly so, to each other.

In my own practice I have found that manual rotation is of some value at times; but I have used the opposite hand from that referred to. In the R. O. P. I use the right hand, and while you may have to get in an awkward position, you will succeed better. I think we must interfere sometimes in the interest of the baby, when the mother's condition doesn't call for it, but we have found out that cerebral hemorrhage in spontaneous deliveries is not an unheard of thing. If we wait too long we may lose some of the babies, or have a serious hemorrhage confront us.

DR. C. R. HANNAH, DALLAS, TEXAS.—I should like to emphasize one or two points. The weight of the mother is a factor in occipitoposterior position. The patient who is short, thick and fat frequently has as a complication occipitoposterior position. In such patients, we may experience trouble at delivery unless the weight

during pregnancy is controlled to not more than twelve or fifteen pounds above the standard weight. The prevention of an abnormal gain in weight during pregnancy is a prophylactic treatment for posterior position, and in those patients who have gained excessively in weight, posterior position should be considered as a possible occurrence at the time of delivery. In considering the size of the pelvis, we, at the same time, should consider the size of the fetus. The pelvis and fetus should be studied in relation to each other, and not separately as is frequently done. What is the difference between a large baby and a normal size pelvis, and a small baby and a contracted pelvis? Mechanically, they are about the same. Fetometry is as necessary as pelvimetry and should be studied and practised. If the fetus is diagnosed as excessive in size, then indication of labor should be considered, for we most frequently find occipitoposterior position complicating the delivery of the excessive size baby.

DR. EDWIN P. SLOAN, BLOOMINGTON, ILL.—Down in our part of the country three-fourths of the mortality from cesarean section is attributed to the fact that the physician in charge has delayed the operation beyond the time at which it should be performed because he is afraid of that particular operation. Now, Dr. Polak compared the mortality statistics of cesarean section with those of other abdominal sections which are usually elective operations, the good risk patient having been prepared for operation. I think that if he would compare his mortality rate with the mortality of emergency abdominal sections for other indications in patients who are as bad risks as patients usually are when they come to cesarean section, he would probably find that the mortality rate in those cases would be forty per cent against his only four per cent mortality in cesarean section.

The operation of cesarean section in itself is not very dangerous. The danger lies in the condition of the patient when brought to operation. In fact, the patients that I have known of, who have died, have been those who were operated upon while *in extremis* and either died on the table or within an hour. It seems to me that by stressing the danger of cesarean section we are increasing the mortality rate by delaying the operation, by encouraging doctors to wait and try everything else and then if they see that the patient is going to die within two or three hours, rush her to the hospital and have an attempt made by cesarean section to save her life. I am sure that in our part of the country it will save the lives of some mothers and babies if more stress is placed upon the early diagnosis of the necessity for cesarean section and less stress be placed upon the supposedly great danger of the operation itself.

DR. POLAK.—I said the mortality in cesarean section was about 3 per cent; that is, in the cases done early, the elective cases. If we take the late cases, the mortality will run from 14 to 20 per cent.

DR. EDWIN P. SLOAN, (continuing).—Answering Dr. Davis, I thought it would be obvious why these cases died so soon. The majority of cases that we see are apparently in almost a dying condition, and the cesarean section was done in an attempt to at least save the life of the baby. A great many of our cases are in shock, have puerperal eclampsia, etc., and are not brought in until it is apparent to the neighbors and the old women, and especially the minister, that the woman is going to die, and then they submit to cesarean section. A great deal of that delay is due to the fear for that particular operation that has been instilled in the average doctor in medical college. Nearly every student is made to believe that a cesarean section is the most awful and dangerous operation known and should be only attempted in emergencies. So these patients are often not brought in until it is apparent that the patient is going to die in a little while unless relieved.

The President's statement that babies delivered when the mother is in a dying condition usually do not live long should not deter us from the attempt

to save their lives. I know of eleven babies that have been delivered by cesarean section performed for the particular purpose of saving their lives, and they are all doing well.

DR. ASA B. DAVIS.—In the case of rupture of the uterus and repair subsequent to cesarean section we notice that most of these accidents occur because the patient does not appear in the hospital for, sometimes, many hours after labor has begun. If such patients had been followed up, admitted to the hospital and delivered by cesarean near term, or before the onset of labor, rupture of the uterus would not have occurred. Of late years we have found, in the Lying-In Hospital, a type of deformed pelvis which is giving us a good deal of trouble. The old time rachitic pelvic deformity is becoming rather rare and its place is being taken by a distinct type which is difficult to recognize at first. These women are usually short and thick set. The lumbosacral angle is well marked and the plane of the front part of the pelvis is unusually low. Pelvimetry discloses measurements up to or above the ordinary standards. The pelvic bones are thick and heavy, resembling the male pelvis. Not infrequently it is impossible to reach the promontory, and very often the internal diagonal conjugate is 12 or more cm. One such case came under my care reporting that she had habitually given birth to children weighing twelve pounds or over. All had been instrumental deliveries resulting in three stillbirths and two children who died within the first five days. I delivered her sixth child, weighing $12\frac{1}{2}$ pounds, by cesarean section. It is well to do pelvimetry in every case, and to estimate the size and conformation of the pelvic cavity. At the same time we must remember that in this way we secure but one side of the equation. Almost invariably in this type of patient the fetus has large cranial bones, thick and heavy, the fontanelles and sutures are small and narrow, the head is block-like and does not mold readily. In such cases it frequently happens that the membranes rupture before the onset of labor and we are apt to find a posterior position. The vertex either entirely overrides the inlet and does not engage, or a segment setting in like a ball valve gives the appearance of beginning engagement. Dilatation is slow and the first stage does not progress. No matter what size the passage may be, we must take into account the size of the passenger who is to pass through it, as well as the "moldability" and possible adjustment of the fetal skull. We find that cesarean section is the safest way to deliver the majority of these cases. It is noticeable in obstetric practice that abnormalities appear to group themselves. This type of patient is evidently not readily recognized and I wish to call attention to it as a type. About two years ago, within a period of six weeks, I saw four of these cases in consultation. They had been allowed to go on in labor for many hours. There was no engagement. Tonic uterine contraction was well marked. This had not been deemed sufficient and pituitrin had been given. In one case the fetal heart had almost ceased. I believe all were delivered by craniotomy. At about this time I saw a fifth patient, a young healthy primipara who had been in labor for thirty-six hours. There was marked evidence of fetal distress and the pelvis was blocked by a fibroid tumor. These conditions should have been determined and prepared for before the onset of labor.

DR. SWERINGEN (closing).—I think the comparison which should be made is that between the mortality rate in cesarean section and the mortality rate in other operative procedures for the same pathologic conditions. They might be compared perhaps with those cases that need cesarean section but are delivered by other means. I don't believe the mortality rate would compare very unfavorably then, taking all classes together.

I have not done a high forceps operation for many years and I am very glad to know that there are so few of them being done.

I recognize, of course, that nature takes care of abdominal adhesions very frequently, but in the cases I reported, suppurative or gangrenous appendicitis took place at the sixth month of uterine gestation and very complete drainage had to be instituted. That suppurative process lasted about four or five weeks, which brought the gestation up to about seven months or within perhaps seven or eight weeks of her expected confinement. The surprising thing in that case was that the adhesions, which we knew were there, could be so well taken care of in the short time before labor began. We were firmly convinced that the uterus would not be able to free itself from the abdominal wall, and yet when we came to open the abdomen after the onset of labor we found that the adhesions, while numerous, were filmy and could be broken by the finger.

DR. TOOMBS (closing).—I tried to emphasize proper prenatal examination and to avoid as far as possible the application of forceps, particularly high forceps. I still believe, however, that after a patient has been in labor for some time, the membranes prematurely ruptured, the uterine wall and lower segment very thin, and the uterus tightly clasped upon the fetus, the high forceps operation, after the head is engaged, offers a far better prognosis, particularly for the mother, than does a podalic version.

DR. LANKFORD (closing).—I would like to say that there is no reason why green soap, which is the obstetrician's chief aid during the delivery (if you have to have an operative delivery), cannot be used after iodine-alcohol or mercurochrome is applied to the external genitalia. What we need is a clean field to work through and this is just simply an effort to find out whether or not iodine and alcohol do give you a clean field.

The patients are clipped rather than shaved for the reason that the shaving itself is an uncomfortable process and leaves a great many fine abrasions which will be still more uncomfortable after the iodine is applied. The patient's convalescence is much more comfortable if she has not been shaved.

DR. ROBERT D. MUSSEY, Rochester Minn., read a paper entitled **Observations on the Treatment of Edema of Pregnancy Toxemia with Ammonium Chloride.** (For original article, see page 222.)

DR. LEE DORSETT, St. Louis, Mo., read a paper on **Magnesium Sulphate in Eclampsia.** (For original article, see page 227.)

DISCUSSION

DR. C. R. HANNAH, DALLAS, TEXAS.—May I ask Dr. Mussey if he considers a standard weight for his patients? Does he consider the gain in weight determined from a standard weight, or from the usual weight of the patient? The standard weight of the patient should be the basis for a gain during pregnancy. I believe that the resistance to toxemia and infection is greater in the patient where the gain in weight has not been more than twelve or fifteen pounds above her standard weight. May I ask Dr. Mussey what is the amount of diet his patients receive when he places them in the hospital for the treatment of edema of pregnancy toxemia, and, also, were they gaining in weight previous to their entrance to the hospital?

DR. MUSSEY (closing).—Dr. Hannah has brought up the question of diet. Some of these patients had been under our care prior to the time they came into the hospital, but we saw many of them for the first time when they presented themselves on account of the toxemia. Those whom we had been seeing had been on

a diet which would keep the patient within normal limits of weight gain, and in most instances the excessive gain in weight was due to increased retention of fluid in the tissues rather than from excessive food intake. In the treatment of the hospitalized patient, 1,500 calories of food were allowed daily.

DR. JAMES E. DAVIS, DETROIT, MICH.—May I ask Dr. Dorsett, in closing, if he will give an explanation if possible for the action of magnesium sulphate?

DR. DORSETT (closing).—I did not go into the details in regard to the action of the drug, because that has been worked out so well by other men before this paper was written, but briefly it has a marked effect upon the central nervous system as a depressor, producing relaxation, varying, of course, in the way it is given. It has no effect upon the uterine contractions, but we use the larger dose because we give it intramuscularly. Those who are using it in brain surgery are getting the same result, a marked diminution in intracranial pressure. I am sure we obtain as much relief from the cerebral edema as we do from the general relaxation of the patient.

As far as the diuretic effect is concerned, I am confident that it has some effect upon the excretion of the kidneys. I am also sure that it has some effect upon the general edema.

Prevention of Stillbirths, by Dr. C. R. Hannah, Dallas, Texas. (For original article, see page 231.)

DISCUSSION

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—The mental attitude of the mother in pregnancy may be considered a very important factor in the well-being of the developing fetus and I have of late paid especial attention to this feature. Patients are often frightened by the gruesome tales of the terrible things that occur to the pregnant woman,—the maternal impressions and malformations that may occur during pregnancy. I try to create a proper mental attitude in my patients by informing them that after the fetus has once formed nothing can change or alter this condition, consequently they cannot be influenced by any such mental impressions. However, I have taken this attitude—and I believe it is the correct one—that the mental condition of the mother during the time she carries the fetus undoubtedly influences the disposition of the unborn child and that it is their duty as mothers to be in the best possible mental condition during the period of gestation, and in that way I generally find that I have happy, friendly, well disposed patients in my charge.

With regard to the cause of stillbirths, there is one feature in the paper that I think is most worthy of discussion, and that is the deaths due to cerebral hemorrhage. We are told that infant deaths from cerebral hemorrhage can easily occur in ordinary vertex presentations in consequence of the continual pounding of the presenting head on the perineum. We are told again that in conditions of moderate pelvic contraction, when the child cannot be born head first, that by reversing the position of the child, bringing the pole of the chin into the superior straight, as is the case in breech presentation, a delivery can often be effected. But now we are told that cerebral hemorrhage is more frequent in breech presentations than in vertex presentations. I challenge that statement, not because of what is found in autopsies, but I believe that the greater frequency of cerebral hemorrhage in breech presentations over head presentations is because of the improper conduct of breech presentations that is still practiced. We all remember, and we have all taught that if the head is not born within eight minutes after the presentation of the umbilicus that the child will die and in consequence we hasten that part of the delivery.

Then again many of us have taught the method of delivery of the after-coming head which consists in inserting two fingers of the left hand in the mouth, the index and middle finger of the right hand across the neck of the child, making pressure downward and bringing out the head in that manner. That method of delivery is absolutely wrong and is largely responsible for the injuries and the death of the baby in the delivery of breech presentations.

The method of delivering the head by suprapubic pressure as brought out by Potter results in very little injury to the fetus and I believe that when properly done that many children can be saved and the incidence of stillbirths lessened by converting a head into a breech presentation and delivering by the method outlined.

DR. JAMES E. DAVIS, DETROIT, MICH.—There is one feature in connection with this discussion that the essayist has not spoken of in any direct way, namely the eugenic control. I am reminded of some work that has been done by the Government Officials in tracing what has been termed the Martin Kallikak family.

A man married or had mated with a half-witted woman and as a result of that mating there were about 480 descendants. The second mating was with an intelligent woman and from that union there were some 490 descendants. From the first mating there were only about two of the entire group that proved to be very useful citizens or who became in any way distinguished. Of the other group, a very large percentage became exceedingly useful in many ways, some of them being signers of the Declaration of Independence, some members of the Supreme Court; a large number were professional men.

The Government spends, I believe, .33 of a dollar in the culture of the human race, specifically speaking. For the culture of lower animals, a much higher amount is expended. For the protection of vegetable life a still larger percentage of money is expended. If we could by a process of education, as our president has said, strongly emphasize the work in connection with this subject and carry it into the field of eugenics, getting the cooperation of all concerned, it would mean very much in the way of improving the records we have in this particular.

One other point: It has been my observation, not only when I was in obstetric practice but since I have been in pathologic work, that when a baby is lost very little attention is given to a study of that case. The study ends in most instances when the baby dies. Each case, I believe, should have an exhaustive study and a most careful record made of the mother and of the family, and also of the placenta. If the child dies, a careful pathologic study could be made of the body. If the child does not die, but is a weakling, a very careful study could be made of the placenta and a careful history kept of the child. This should be kept as an accurate permanent record and it would do much, I am sure, towards helping when the next problem has to be met.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—I unfortunately did not hear whether the Doctor had any way to prevent that large percentage of stillbirths that we class as macerates. They seem to be the ones that add about 1 per cent to 1.7 per cent to our stillbirth mortality.

In the North we don't meet syphilis quite as frequently as down South. Following this along in a prenatal clinic for a number of years our 4-plus Wassermanns ran less than 3 per cent and our 3 and 4-plus ran about 6 per cent. History has no significance at all. We cannot tell syphilis by the history. We must have repeated Wassermanns and study the placenta and the fetus. We have found even beginning in the last weeks of pregnancy that the antisyphilitic treatment will give some results, and women who have repeatedly given birth to stillbirths have been delivered of living children when the treatment has been begun in the last few weeks of pregnancy.

As to the statement regarding induction of labor in contracted pelvis or overgrown fetus, I want to take a stand against that and say that neither you nor I nor any other living man can tell accurately how large the baby is, nor how many weeks old it is. Our experience has been in letting these cases alone that we have had the most remarkable surprises, and almost all obstetricians have had that same experience. In other words, you don't know within two or three weeks the exact length of pregnancy whether you use Reed's method or any other method, and children that you think are overgrown often surprise you by being relatively small; and those that you think are small, will be large. I have repeatedly put my hand on the head and made measurements of the head and thought it was a small baby and then been surprised to find an 8½ or 9 pound child come through. Again we find that 81 per cent come through spontaneously in these relatively contracted pelves, and if that is so they are entitled to the test of labor and a clean section rather than add to the 54 per cent that result in operative necessity.

Another point I want to call attention to which has prevented more stillbirths perhaps than anything else, and that is listening to the fetal heart during each pain in the second stage. We have saved more babies by delivery by episiotomy or by low forceps or by expression as a result of the index that has been given by the fetal heart slowing or becoming irregular than anything else we have to offer in the prevention of fetal mortality.

DR. BURNLEY LANKFORD, NORFOLK, VA.—I would like to get the opinion of some of the other members about the conversion of breech into cephalic presentation. If the fetus is easy to get into the cephalic position, the next time the mother comes back, it has gotten into the breech again, and if they are difficult to convert it is safer to let them alone, because you do not know what the position of the cord may be and what the reason may be for the breech presentation.

I was particularly glad to hear Dr. Hannah mention the avoidance of haste after the head is delivered. As soon as the baby's head is born unless there is some emergency, it is much safer for the child to allow the woman to deliver herself by the force from behind.

About the question of the postmature or relatively oversized child, I should like to hear the experience of some of the members on that point. Does any one know of any accurate experimental work on the possibility of influencing the size of the child by the mother's diet? I believe that is still a mooted question and personally I don't believe that much can be done by that method. It seems to me that the point brought out that the fetus is a parasite and will get what it needs for its growth from the mother, no matter what the mother's condition, is nearer the truth, rather than the fact that starving the mother will starve the baby.

A patient was ill during the latter three or four months of pregnancy. She had nausea, anemia and general arthritis and a number of other complaints, and was practically skin and bones, but she came along with one of the most beautifully developed fetuses I ever saw. I know that she got almost no food during the last three months.

DR. GORDON K. DICKINSON, JERSEY CITY, N. J.—The after result is not merely whether the mother or child recovers, but it is the mentality of that person later in life. We know that first children are prone not to be quite so clever and quick as the children who come afterward in a large family, and to get competent obstetrics I believe we should think in terms not of morbidity or mortality of the mother and child, but of the future usefulness of the coming brain.

DR. FOSTER S. KELLOGG, BOSTON, MASS.—I would like to say that we have given up external version in the out-patient department because I believe that we lost some babies from separated placenta.

I would like to ask what is meant by "studying the fetal heart during pain"? Under just exactly what circumstances is interference justified?

DR. WM. A. FOWLER, OKLAHOMA CITY, OKLA.—Dr. Kellogg's statement is interesting. I have recognized the possibility of harm from external version. I would like to know if there have been other disasters reported from external version. I have always done this when possible. Very rarely have I been unable to turn a child from breech to vertex and I have never had harm result from it. I always use a good deal of gentleness and if there is much tonicity of the uterus I wait a day or two to do the turning. I have rarely had a case turn back to a breech presentation.

Our mortality statistics are usually compiled from the clinical service and we all know the great disadvantage of those statistics. Clinical cases do not give us nearly the good results that our private cases do. At the Oklahoma Lying-In Hospital, including all cases, even those that come in with dead fetus, our fetal mortality has been less than 4 per cent. They are all private cases. Among my own patients, eliminating the out of town cases and those that did not receive prenatal care, the fetal mortality has been 1 per cent. I think prenatal care offers our greatest opportunity to conserve fetal and maternal life and health.

DR. HANNAH (closing).—Postmortems are valuable and should be held on all stillbirths. The pathologist can better diagnose syphilis by the study of the different sections of the organs, and it is often difficult to make a diagnosis of syphilis without this report. The statistics which I quoted relative to the cause of stillbirths from the cephalic and breech presentations were those of Francis J. Browne, of Edinburgh, and were based upon postmortems. I believe in converting the breech into cephalic presentations when indicated, but judgment must be used in this procedure. Quite frequently, this can be done with ease near the termination of pregnancy, but should we wait until the onset of labor, the results may not be as satisfactory. This position may be maintained by the use of an abdominal binder. I favor cephalic to that of the breech presentations in delivery because there is greater injury to the brain in the after-coming head, and statistics will probably bear me out that in the breech the mortality of the fetus is greater than in the cephalic. Breech deliveries are not physiologic, but have their place, and should not be used where the cephalic is indicated. The obstetrician should use that method which removes the hazard of injury to the fetus and the mother. I believe in the teaching of Reed, that by exercising ordinary care and judgment, the physician may diagnose postmaturity, or the excessive size fetus. I cannot bring myself to the belief that the excessive size fetus, weighing ten or twelve pounds should remain *in utero*. Why should not labor be induced before the fetus becomes excessive in size? It is the business of the obstetrician to diagnose the maturity and postmaturity of the fetus. This is not so difficult. I find that medical students and internes manifest greater interest in the mechanism of labor, and are more alert for the welfare of the fetus from the study of maturity and postmaturity of the fetus, and this knowledge assists in the prevention of stillbirths. If fetometry confirms a fetus of excessive size, nine, ten or twelve pounds, and the date of confinement, calculated from last menstruation and quickening, has been determined, induction of labor may be considered within a few days after the date of expected confinement. By practical experience, I find that more injuries occur to the excessive size fetus during delivery than in the smaller, matured fetus. I know that the premature fetus cannot endure shock and traumatism as the matured fetus. We should avoid the two extremes, prematurity and postmaturity, and deliver the mature fetus rather than the premature or excessive size fetus. The greatest advancement during the next few years in obstetrics will be in the prophylaxis and prevention of injuries and death to the newly born.

DR. ASA B. DAVIS, NEW YORK CITY.—I take issue with the statement as to induction of labor in overterm pregnancies. I do not agree with the teaching that there are many overdue children, necessitating induction of labor, or that we have arrived at a time when it is possible to determine the size of the unborn child, or the duration of pregnancy with sufficient accuracy, to make it of use. While it is undoubtedly true that in the lower animals, and in the human race, pregnancy sometimes does continue considerably beyond the usual time allotted for full term gestation, and that the fetus develops with increasing rapidity in such cases, in my experience this is an infrequent occurrence. We should remember that the last few weeks of uterogestation are very important, especially in the development of the cardiovascular system of the fetus. I am well aware that a great many obstetricians are frequently and habitually finding large and overdue children, and are using this as an excuse for induction of labor at a time convenient to themselves and the patient. Undoubtedly in many instances this procedure is carried out satisfactorily, but, just as certainly in some cases it causes unnecessary trouble and danger to the mother and child.

Report of a Case of Mesenteric Cyst, by Dr. Edmund D. Clark, Indianapolis, Ind. (For original article, see p. 238.)

DISCUSSION

DR. HENRY SCHMITZ, CHICAGO, ILL.—Dr. Clark stated that radiation was given because malignancy was suspected. This is an instance where radiation was applied without making a diagnosis and consequently success could not result,—not due to the radiation therapy but due to the lack of a diagnosis. I feel that a positive diagnosis should always be made before treating any disease. This would have necessitated an exploratory laparotomy and tissue could be removed for microscopic diagnosis. Only then would it be possible to decide correctly whether radiations are indicated.

DR. JAMES E. DAVIS, DETROIT, MICH.—Here is a case where the diagnosis should be made *in situ* from the gross characteristics. The microscopic diagnosis in a case of this kind is practically useless, and any one who has had practical experience will bear me out in this statement. Whether you have or have not an endothelial lining or fat cells lining the cyst, you cannot make the diagnosis if it is detached from the tissue which held it. So the clinician should make the diagnosis by the most careful observation as to the mobility, as to the attachment, and then if he wants to consult the laboratory findings as to type of the lining, all well and good, but that will not add very much to the substantial diagnosis of this kind of a case. It is practically useless to send a specimen of this kind to the laboratory without any data, and expect the laboratorian to make a diagnosis.

DR. O. G. PFAFF, INDIANAPOLIS, IND.—I reported two cases of mesenteric cysts several years ago, one at our New York meeting and one at the St. Louis meeting, and have since that time had two more. When I found the first two I thought they were very rare, as they evidently are. However, I felt when I went over the literature, and especially when I found my second case, that there must be a good many more of these cases than come to the surface.

In one case I found very definitely the graphic description applied to the mobility of these tumors. This tumor appeared in the upper left side, was about as big as an orange, could be moved to the other side of the abdominal cavity, and once in a while it would drop far down into the pelvis. I think that explains the phenomenon found in a great many of these cases where the tumor has suddenly appeared. The patient may have gone along without any history and suddenly,

perhaps following a fall from a street car or down a stairs, a tumor appeared in the lower abdomen. It may have been lying in the pelvis for years and was not discovered until displaced into the abdominal cavity.

I drained two of the four cases, and enucleated one. The last one was in a very young girl, about six years of age, who had had attacks of indigestion all her life, quite marked right sided pain and a good deal of nausea and vomiting. Suddenly she had an acute attack of obstruction of the bowels, with some temperature and signs of a tumor in the right side. A diagnosis of acute appendicitis was made and at operation we found a cyst involving the mesentery of the ileum which had dragged the ileum down and produced an absolute obstruction. We had to make a resection of about six inches of bowel and the child got well.

DR. CLARK (closing).—I think Dr. Schmitz' criticism of my treatment is a just one. The x-ray was not used with the idea of curing the patient, but with the hope that the discomfort and pain might be relieved. Inasmuch as the patient absolutely refused surgery, there was some justification in using the x-ray.

(To be continued in the March issue.)

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

THE RELATION OF THE ENDOCRINE SYSTEM TO PREGNANCY*

A SUMMARY OF RECENT VIEWS

BY AARON CAPPER, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Jefferson Medical College)

THE purpose of this paper is to correlate certain of the phenomena of normal pregnancy with their relationship to the secretions of the ductless glands. We wish to indicate how some of the disturbances that may complicate pregnancy are either directly or indirectly dependent upon dysfunction of one or more of these glands. The great part of the science of endocrinology rests on speculation. The definitely established and proved facts concerning the action of these glands are few in number. It is only during the last few decades that the great importance of these structures on human economy is realized.

We are acquainted with the malformations that result when a baby is born with a maldeveloped thyroid gland, and of the astounding results that follow the administration of the extract of this gland. The parathyroid glands are each about the size of a pea; when three of them are removed nothing happens; when the fourth is removed there follow twitchings, spasms, paralysis, dyspnea and death. Cushing¹⁷ has demonstrated that no ill effects follow the extirpation of part of the anterior lobe of the pituitary gland (a gland only a few grams in weight) but its complete removal causes death. (More recent investigation attributes the death coincident with the removal of the pituitary gland to injury of the hypothalamus.) The romance of the glands of internal secretion and their relationship to human economy is in its very incipiency. We are cognizant of the possibilities that are forever present in that domain. With keen expectation one looks forward to the developments that the future holds in store regarding the ductless glands. The scientific, and particularly the medical, world is still vibrating to the chords of joy which the fingers of Banting and his coworkers struck. Who can foretell what tomorrow may bring?

THE FETUS AND ITS DUCTLESS GLAND SYSTEM

In order to determine the relations of internal secretions to pregnancy, it becomes necessary first to decide whether the ductless glands of the fetus itself have any influence on pregnancy. If the fetus

*Read before the E. P. Davis Obstetrical Society, Jefferson Medical College, Philadelphia, Pa.

elaborates internal secretions, we must ascertain whether and to what extent they, in addition to the maternal secretions, affect the course of pregnancy.

Some authors maintain that the internal secretions of the fetus itself play no part in its development and in the progress of pregnancy, and that the fetal glands of internal secretion have hardly any function during intrauterine life. Others claim that the secretions exert some influence by their admixture to the maternal blood. A little contemplation, however, will soon convince one that the internal secretory glands of the fetus are likely to wield a very powerful effect. A marked hyperemia is found in the thyroid glands of fetuses. The mammary glands of newborn boys and girls contain colostrum. The prostates of newborn boys exhibit some hyperplasia, and the uteri of newborn girls often show distinct hemorrhage. But, even if we were unaware of these findings, we could suppose that those organs which throughout life influence growth and development, would naturally function to their utmost during the period of most marked growth activity. We thus can conclude, that the fetal internal secretory glands begin to function during intrauterine life; that not only do they have a decided influence on the growth and development of the fetus per se, but that the fetal internal secretions probably pass into the maternal blood; that they are added to the maternal endocrine secretions and thus simulate a hyperactivity of the maternal glands of internal secretions.

We shall now take up the individual glands, point out their influence on pregnancy, and wherever possible mention the experimental evidence upon which the statements are based.

THE PLACENTA

That the placenta must be considered a gland of internal secretion is now almost universally accepted. The pregnancy-hyperplasia of the breasts in the mother and fetus is said to be produced by a specific hormone or ferment which proceeds from the chorionic epithelium of the placenta. Halban³ proved this by a remarkable observation. He noticed that the breasts in a pregnant woman go on developing and enlarging even if the fetus had been dead a long time if the placenta remained alive. When, however, the placenta also died, the further development of the mammary glands ceased and milk began to flow. Halban thus concluded that since the onflow of milk always coincides with the removal or death of the placenta, and is enhanced by extirpation of the ovaries, the placenta and ovaries induce the growth but inhibit the secretion of the mammary glands.

Starling and Lane-Clayton¹⁴ have regarded the fetus as the source of the mammary gland hormone. Actually, they even succeeded in inducing growth of the mammary glands by the injection of embryonal extracts into the peritoneal cavity of rabbits that had not yet been impregnated. This fact, it seems to us, does not conflict with Halban's views, for it is quite likely that the placental hormones are present in the tissues of the fetus. As just mentioned, also, the enlargement of the newborn's breasts is ascribed to this hormone.

C. M. Stimson²⁰ claims that the placental extract or hormone is not a galactagogue, and that as long as the placental hormone is in the maternal circulation, it exercises an inhibitory effect on mammary

secretion. These observations coincide with and are confirmed by the experimental results of O. Frankl²¹ on pregnant mice.

That the ovaries are not necessary for the pregnancy-hyperplasia of the mammae was proved when, in spite of castration undertaken in the early stages of pregnancy, the development of the breasts proceeded in a normal manner, and the women were able to suckle their children. In fact, it seems that removal of the ovary later exercises favorable influences on milk-production, as breeders state that castrated cows yield abundant milk.

We, therefore, infer that the enlargement of the breasts in pregnancy is chiefly the result of hormone activity, especially of placental hormones, and that secretion of milk is induced by the removal of the placenta and is enhanced by extirpation of the ovaries.

THE OVARIES

The internal secretion of the ovary is elaborated in the corpus luteum. This was demonstrated by the ingenious experiments of Frankl, in 1910 and in 1923.²¹ The functions of this secretion, as stated by Frankl, consist in a regulation of the blood-supply, of the formation of the decidua, and the implantation of the ovum. The cessation of ovulation is also ascribed to the persistence of the corpus luteum. Frankl found that when he destroyed the corpus luteum in a woman by means of a cautery, the next succeeding menstrual period failed to occur.

In the later months of pregnancy, it is the "interstitial glands" or theca cells which exert the chief ovarian influence on pregnancy. These cells in turn are stimulated to internal secretion by the products of the placental villi. This so-called "interstitial gland" consists of the hypertrophic theca cells which develop about the periphery of follicles which are undergoing atresia. These cells are particularly well developed during pregnancy. It is believed that these transient structures give rise to an internal ovarian secretion. It is quite probable, however, that the secretion of these theca cells is closely related to that produced by the corpus luteum.

That the development of the fetus subsequent to the implantation of the ovum is not dependent upon the corpus luteum was shown by Kleinhaus and Schenk.⁸ They extirpated the corpus luteum and pregnancy was not interrupted.

In concluding the discussion of the relationship of the ovarian internal secretion to pregnancy, we shall quote the words of Falta,¹³ a recognized authority on the problems involved in internal secretion. He says: "Surveying now the alterations described, which take place in the organism of pregnant women, we find that they are entirely analogous to those which occur in the premenstrual period, while, however, the phenomena of the premenstrual period proceed from the ovary, there can be no doubt at all that the similar, but potentized, manifestations of pregnancy proceed from the developed egg. It, therefore, seems to us that the conclusion lies at hand that all the manifestations of the premenstrual period are set free by the maturing follicle, which only renders intelligible the fact, that the extirpation of the ovaries during pregnancy has no influence on this phenomenon, as the maturing ovum no longer is found in the ovary, but in the uterus."

No definite evidence exists at the present time as to the etiologic relationship between corpus luteum secretions and hyperemesis gravidarum, although there have been a few cases reported that improved under the administration of the extract.

Granted that one of the functions of the corpus luteum is the imbedding and safe walling-in of the ovum after it has been fertilized, the question arises whether in women who habitually abort, we may not be able to demonstrate certain irregularities in the corpus luteum formation.

A very valuable contribution to this subject has been recently published by Allen, Pratt, and Doisy.²⁴ These investigators succeeded in extracting a lipoid hormone from ovarian follicular cysts, the corpus luteum, normal ovarian follicles, the corpus luteum of pregnancy, the human placenta, and from embryonic tissues. The authors conclude that "the corpus luteum can be excised as early as twenty days following the last menstruation without interfering with normal gestation; consequently, this endocrine function of the corpus luteum in woman during this time does not seem a necessary one."

Regarding the endocrine function of the placenta, the above mentioned authors say: "It is rather difficult to see how such large quantities of active substance (lipoid extracts of the placenta which seem to possess the same potency as the ovarian follicular hormone) could be retained in such a vascular organ as the placenta without passing freely into the maternal circulation. Since it is so well established that development of the follicles is seriously inhibited during pregnancy, it would seem to us more probable that the human placenta takes over from the ovaries the major part of the function of the secretion of this hormone, thus maintaining the maximal function of the genital tract, and initiating growth in the mammary glands during gestation. The increased amounts of this hormone in the maternal organism would seem a logical cause of the hypertrophy of other endocrine organs during pregnancy. Whether this function is borne by the embryonic tissue of the placenta or by both maternal and embryonic parts acting as a unit, is still to be determined."

THE EPIPHYSIS (PINEAL GLAND)

We must refrain from a discussion of the importance of the pineal body, because our knowledge concerning its function and especially its relation to pregnancy is practically nil.

THE PANCREAS (ISLANDS OF LANGERHANS)

Not much had been known, heretofore, concerning the internal secretion of the pancreas and, therefore, concerning its relation to pregnancy. With the advent of insulin and our increased information concerning the activity of the cells of Langerhans, we may hope in the future to learn more about their specific rôle during pregnancy.

THE THYMUS GLAND

The thymus gland ordinarily atrophies with the approach of puberty and, therefore, does not often exert any influence upon pregnancy. Bompiani, however, has shown that in cases of abnormal persistence of the organ it undergoes diminution in size during pregnancy and

enlarges again after delivery. Its physiologic atrophy is generally ascribed to an inhibitory effect of the ovary on the thymus.

The persistence of the thymus may also give rise to a picture simulating Basedow's disease. More likely, however, this is the result of actual hyperthyroidism, for it is now recognized that in most cases of enlarged thyroid there also exists an accompanying hyperplastic thymus gland.

THE THYROID GLAND

The fact that the thyroid gland is enlarged during pregnancy, was known even in antiquity. There is no doubt that this increased volume is associated with an increased function.

Lang,¹ in a series of 133 cases of pregnancy, found the thyroid enlarged in 108, the organ beginning to enlarge definitely about the fifth month. The increase ceased, however, if thyroid extract was administered, and began again when the extract was withdrawn.

H. W. Freund, in 1882, first made a systematic study of the thyroid gland in pregnancy. It is enlarged in 65 to 90 per cent. of the cases, and gradually diminishes in the latter part of the puerperal period. The enlargement is due to a hypertrophy and hyperplasia of the tissues. The changes in the glandular epithelium and the marked increase of fresh colloid point to an increased secretory activity of the organ.

It appears that the thyroid gland is influenced greatly by the activity of the sexual organs. During puberty and during the menstrual period it is the ovarian secretion, and during pregnancy it is the placental materials which lead to a hypertrophy of the gland.

In some pregnant patients definite evidence of hyperthyroidism exists, such as marked nervousness, irritability, emotionalism, tachycardia, tremors and an enlarged thyroid gland. Daly and Strouse²³ studied twenty-five cases of this sort. They treated them with no other medication than three to five drops of Lugol's solution, three times a day, and all the patients became free from symptoms, usually within seventy-two hours.

Some authors are inclined to attribute the phenomena of eclampsia, hyperemesis and puerperal psychoses to a thyrogenous influence, but there is, as yet, no experimental evidence to support this claim.

The reason for the thyroid gland hypertrophy during pregnancy evidently is the demand for increased metabolic activity required by the hypertrophy of maternal tissues and the additional life within the uterus.

THE PARATHYROID GLANDS

These glands undergo considerable hypertrophy during pregnancy, and their secretion apparently is essential to a normal progress of gestation. To a great extent they act through the calcium metabolism.

The typical parturient tetany is a rare malady. Studies upon cases that have come to autopsy, and animal experiments go to show that the tetany occurring during pregnancy results from an insufficiency of the parathyroids.

Pregnancy makes increased demands on the parathyroids, a fact quite obvious from the increased amount of calcium to be metabolized for deposit in the fetus. Quite often are found disturbances of other endocrine glands in cases of tetany of pregnancy.

The tetany of pregnancy is a particularly severe form of tetany on account of the involvement of the respiratory muscles. Published results show that 7 per cent of patients died during this affection, even though pregnancy was terminated.

Vassale, Pepere, and Zanfrotnini showed lesions of these organs after death from eclampsia. They also showed that experimental parathyroid insufficiency beginning during the last three months of pregnancy caused grave eclampsia. In two of the three dogs in which the parathyroids had been removed, Vassale was able to prevent eclampsia by giving large doses of parathyroid extract orally.

In a recent editorial in the *Journal of the American Medical Association*²² we read: "Dragstedt and his coworkers at the Northwestern University Medical School have indicated the close relationship between eclampsia and the toxemia occurring during pregnancy in the parathyroidectomized dog. Both in the latter and in man there is evidence for the existence of a toxemia arising from the pregnant uterus and caused by toxic protein derivatives. Both diseases are characterized by the appearance of tonic and clonic convulsions, usually during the latter part of pregnancy or immediately after delivery. Both disorders are relieved by emptying the uterus. Some critics might aver that it is a far cry from parathyroid tetany to eclampsia, but the Northwestern University physiologists have found that in the dog, through removal of the parathyroids, a toxemia develops that most often produces tetany but which may in many cases cause profound depression, a gradual cachexia associated with anorexia and diarrhea, or a marked ataxia and stupor without tetany. It is, therefore, not logical, they add, to say that eclampsia does not represent a functional parathyroid deficiency simply because it is possible to differentiate by clinical signs, eclampsia from tetany. A relative or absolute parathyroid deficiency in the dog renders it liable to toxemia during pregnancy, which usually manifests itself as tetany but may produce other nervous or constitutional symptoms."

The treatment of parathyroid insufficiency, aside from the general and symptomatic management, consists in the administration of parathyroidin and calcium salts.

THE HYPOPHYSIS (PITUITARY GLAND)

The hypophysis undergoes a marked hypertrophy during pregnancy. Its weight can rise to two and a half times as much as normal. Enlargement of the anterior lobe is exclusively responsible for this increase in weight. The anterior lobe becomes more juicy, softer, and heavier. This enlargement is chiefly due to an increase in the number and size of the "chief cells," and their ultimate transformation into the so-called "pregnancy cells." In the later stages of pregnancy more than four-fifths of the organ may consist of the newly-formed cells.

It was L. Comte, Moulon and Launois who first pointed out this enlargement of the pituitary. Launois and Moulon² confirmed this in two instances, one of the parturients having died from eclampsia. They found a marked increase of the cellular elements. In a more recent work, Launois reiterates his previous conclusion that in pregnancy the anterior lobe is in a state of marked "hyperactivity."

Cushing³ has found that repeated pregnancies may so enlarge the

pituitary gland as to cause transient bitemporal hemianopsia due to pressure of the gland on the optic commissure. Enlargement of the pituitary gland before or during menstruation, or a disturbed secretion, may frequently be the cause of the so-called menstrual headaches.

Enlargement of the hypophysis during pregnancy is sometimes so considerable as to give rise to cerebral manifestations. In rare cases even a pressure action on the chiasma seems to be possible. V. Reuss¹⁶ described repeated temporary blindness during pregnancy, while Bellinzona and Tritondani reported bilateral narrowing of the visual field. Certain manifestations point to an increased hypophyseal function during pregnancy, such as increased growth of the pelvis and osteophytic formations on the internal surface of the skull. Tandler and Grosz¹⁵ emphasize that in gravid women there is a coarseness of the facial features, especially of the soft parts of the nose and lips, and moreover, that a thickening of the hands is not rare,—manifestations that remind one of a slight grade of acromegaly. These acromegaloid changes of the hands, feet, and sometimes of the face, are directly attributable to the oversecretion of the anterior lobe of the pituitary body.

In the usual cases of acromegaly in women, we often find amenorrhea and sterility. As far as present reports go, pregnancy is not disturbed and runs to a successful termination in women suffering with acromegaly.

Whether the posterior lobe adds any additional secretion during labor to stimulate uterine contractions is not known; but we are all aware of the potency of the extract of the posterior lobe of the pituitary gland upon uterine contractions when administered to a pregnant woman.

The glycosuria of pregnancy is also due to a stimulating effect of pregnancy on the pituitary gland. Some direct experimental evidence for this assumption can be found in the work of Diton, who has shown that injections of ovarian extract stimulate the secretion of pituitrin. J. H. Burn found that pituitrin, though it did not in itself cause hyperglycemia, was, nevertheless, able to inhibit the fall of blood sugar which would otherwise have followed the injection of insulin. I think, therefore, the statement is justified that the glycosuria of pregnancy is due to the stimulating effect of the pregnancy on the pituitary gland which then directly inhibits the internal secretion of the pancreas. It may well be that in its inception this process is physiologic, diverting the stream of sugar from storage in the maternal tissues to the use of the fetus.

THE ADRENAL GLANDS

Experimental evidence fully sustains the view that the mother's autoprotective resources are developed coincidently with the growth of the fetus through a corresponding augmentation of the functional activity of the adrenal system. The following observations on the changes of the adrenals during pregnancy are definitely established: (1) The cortex of the adrenal undergoes hypertrophy during pregnancy, especially in the zona fasciculata and the zona reticularis. (2) There is an appearance of vacuoles in the cells of the zona reticularis and a marked pigmentary accumulation which must be looked upon as a sign of increased secretory activity. (3) During pregnancy the

cholesterin content is increased in the cortex of the adrenal gland. The lipoidemia, i.e., the increase of fat in the blood seen in normal pregnancy is largely the result of the increased cholesterin formation in the cortex of the suprarenal gland.

Pollak could demonstrate during pregnancy a heightened glycosuric action of adrenalin. This tendency of pregnant women to alimentary glycosuria and alimentary ketonuria is well known. Many authors cite those disturbances as stigmata of a disturbance of liver function, as a result of degenerative changes. But Wilhelm Falta says that it is rather incredible that a normal physiologic process, such as pregnancy is, should regularly lead to such severe disturbances of the liver, and he would, therefore, regard the glycosuria as an increased irritability of the liver cells rather than as a degenerative process.

The occurrence of pigmentation on the face, around nipples and abdomen during pregnancy is explained in the following manner: the pigment is iron-free and, therefore, is not a derivative from the blood. It is well known that disturbed function of the adrenals will lead to the deposition of pigment. In Basedow's disease, e.g., the production of adrenalin is increased and in Addison's disease it is lessened, and in both of these conditions abnormal pigmentary deposition is frequent. Hence, it is quite possible that the regular occurrence of pigmentation, along the linea alba, navel, perineum, labia majora, areolae of nipples, and in the face (chloasma uterinum) is due to increased action of the adrenals.

The fact is also recognized that there is a distinct increase in growth of hair during pregnancy, due to increased activity of the suprarenal cortex. Halban demonstrated the increased-growth-tendencies of the hair in animal experiments. After shaving the abdomen of pregnant animals the hair grew faster than on the abdomen of nonpregnant animals similarly treated. There are also cases on record of women who, during each period of pregnancy, became excessively hirsute, and following labor there was a gradual loss of hair and a return to normal.

All of these facts support the assertion that there is an increased activity of the adrenals during pregnancy. It is true, that thus far it has been found impossible to demonstrate an increased adrenalin content of the blood during pregnancy. This, however, may perhaps be due to our lack of a finer laboratory technic.

Sajous¹² explains the occurrence of eclamptic seizures on the following basis: "During pregnancy the mother's blood becomes increasingly laden with waste-products, those of the developing fetus being added to her own. To protect the organism her adrenal system and thyroid apparatus become increasingly active, owing to the exciting action of the waste products on these organs. When the adrenal system does not become sufficiently active to enhance adequately the blood's antitoxic properties, the toxic wastes are allowed to accumulate in the blood in sufficient quantities to provoke convulsions. The convulsions are due to irritation by these poisons of the vasomotor and sympathetic centers. All the vessels of the body being violently contracted, a wave of blood is forced into all capillaries, including the cellular elements and neuroglia of the cerebrospinal system. The activity of the cortex being suddenly enhanced, a flood of impulses is transmitted to every portion of the spinal system and the seizure occurs."

CONCLUSION

This summarizes our present meager knowledge of the relationship between the glands of internal secretion and pregnancy. In conclusion, we wish to say a few words concerning the endocrine therapy of certain disturbances complicating pregnancy.

The pregnant condition brings with it an increase in the metabolic processes of the female organism, resulting in part from the hyperplasia of the thyroid, adrenals, and hypophysis. The increased secretion of these organs brings about an increased irritability or power of response of the sympathetic and parasympathetic systems. Some authors who maintain that the pernicious vomiting of pregnancy is due to this irritation of the sympathetic nervous system, advocate ovarian extract which is supposed to have an inhibitory action on the sympathetic system, and thus produces relief in a certain number of cases. It has also been observed that the blood of eclamptic patients has the power of vasoconstriction, due possibly to an overactivity of the hypophyseal-adrenal system. Also this vasoconstriction can be overcome by the injection of ovarian extract.

The neuropathia gravidarum, a tendency to dropsy, and the dermatoses of pregnancy are also probably expressions of excessive or perverted secretory activity of the endocrine glands.

It stands to reason, therefore, that, if future investigation delineates more clearly and definitely the exact *modus operandi* of the toxemias in relation to internal secretions, we shall then perhaps be enabled to have a rational system of endocrine therapy for these conditions. But until these means become available, strict adherence to the fundamental methods must be advised; namely, rest, hygiene, elimination, and stimulation.

REFERENCES

- ¹Lang: *Ztschr. f. Geburtsh. u. Gynäk.*, 1889, xl, 34.
- ²Comte: *Thèse*, 1898.
- ³Halban, J.: *Monatschr. f. Geburtsh. u. Gynäk.*, 1900, xii, 498.
- ⁴Halban, J.: *Arch. f. Gynaek.*, 1903, lxx, 205.
- ⁵Launois and Moulon: *Compt. rend. Soc. de biol.*, 1903, p. 443.
- ⁶Frankl: *Arch. f. Gynaek.*, 1903, lxxviii, 438.
- ⁷Seitz: *Innere Sekretion und Schwangerschaft*, Leipzig, Barth., 1913.
- ⁸Kleinhaus and Schenk: *Ztschr. f. Geburtsh. u. Gynäk.*, lxvi, 213.
- ⁹Barker: *Endocrinology and Metabolism*, New York, 1922, D. Appleton & Co.
- ¹⁰Launois: *Thèse de la faculté des sciences de Paris*, 1904.
- ¹¹Launois and Moulon: *Ann. de gynéc. et d'obst.*, 1904, i, 2.
- ¹²Sajous: *Internal Secretions and Principles of Medicine*, Philadelphia, 1918, F. A. Davis.
- ¹³Falta: *Endocrine Diseases*, Philadelphia, 1923, P. Blakiston's Sons & Co.
- ¹⁴Starling and Lane-Clayton: *Proceedings Phys. Soc.*, London, 1905, lxxvii, 41.
- ¹⁵Tandler and Grosz: *Wiener klin. Wehnschr.*, 1907, xx, 1596.
- ¹⁶Reuss: *Wiener klin. Wehnschr.*, 1908, xxi, 1116.
- ¹⁷Cushing: *The Pituitary Body and Its Disorders*, Philadelphia, 1912, J. B. Lippincott Co.
- ¹⁸Hofbauer: *München. med. Wehnschr.*, 1920, lxxvii, 617.
- ¹⁹Tomor: *Arch. für Frauenkunde u. Eugenik*, 1921, vii, 111.
- ²⁰Stimson: *AM. JOUR. OBST. AND GYNEC.*, 1922, iv, 413.
- ²¹Frankl: *AM. JOUR. OBST. AND GYNEC.*, 1923, vi, 399.
- ²²Editorial: *Jour. Am. Med. Assn.*, 1924, lxxxiii, 1433.
- ²³Daly and Strouse: *Jour. Am. Med. Assn.*, 1925, lxxxiv, 1798.
- ²⁴Allen, Pratt, Doisy: *Jour. Am. Med. Assn.*, 1925, lxxxv, 399.

Selected Abstracts

Syphilis

Browne: *On the Influence of Pregnancy on the Wassermann Reaction and on the Clinical Manifestations of Syphilis.* *Journal of Obstetrics and Gynaecology of the British Empire*, 1923, xxx, 519.

The author found no positive evidence that the Wassermann reaction is modified by pregnancy. In no case of a Wassermann-negative mother delivering a macerated fetus was it possible to find spirochetes in the fetus. Unless organisms are demonstrable, no macerated fetus may be considered syphilitic. Certain pathologic changes are characteristic in the tissues of the syphilitic fetus. In the macerated fetus of a Wassermann-negative mother these changes do not come up to the standard relative weight proportions found in spirochete-positive tissues. So-called latent syphilitic women without history of positive Wassermann (habitually delivering at or before term stillborn infants or infants dying in the first few days after birth, in whose tissues spirochetes cannot be found) may represent some as yet obscure blood disease allied to that of general fetal edema. In these cases macerated, spirochete-negative fetuses tend to recur with successive pregnancies. In each case the secondary manifestations of syphilis, enlarged liver, spleen, and placenta may be found, but no spirochetes.

In 48 pregnant women with presumably recent syphilitic infection the Wassermann reaction was positive in 82 per cent. In the four exceptions some treatment had been received or positive evidence of syphilis was lacking. No evidence was obtained, therefore, to show that pregnancy modified the blood reaction. While a history of syphilis was obtainable in 70 per cent of Wassermann-positive primigravidae, it was obtained in only 2 per cent of multiparae. The Wassermann reaction on the blood from the umbilical cord is a reliable means of diagnosing syphilis of the fetus. The reaction is slightly less positive than the mother's blood.

II. W. SHUTTER.

Bathe: *The Sachs-Georgi Flocculation Reaction in Pregnancy.* *Monatsschrift für Geburtshilfe und Gynäkologie*, 1922, lviii, 21.

A study was undertaken to determine whether in a pregnancy, which is associated with changes in function of various organs, a flocculation reaction would be obtained. Sera from 600 women were studied. The patients were divided into three groups depending upon the method of studying the serum. It was found that there was a marked tendency to autoflocculation of the serum. This occurred in from 10.4 to 26.2 per cent of the cases, depending upon the group. The increased incidence of autoflocculation in the sera of pregnant women speaks for an increased nonspecific sensitiveness. Deducting the cases of autoflocculation, it appears that the results of the Sachs-Georgi reaction in pregnant women run parallel to the nonspecificity of the Wassermann reaction. Of greatest importance are the extracts used in the tests. These must be controlled by testing sera other than those from pregnant women. That serum diagnosis of syphilis during pregnancy based upon purchasable or even freshly prepared extracts should be made with great reserve, and without clinical support, is void of meaning.

J. P. GREENHILL.

Vulovic, Ljubomir: On the Early Diagnosis of Congenital Syphilis at Birth Through Demonstration of Spirochetes in the Umbilical Cord. *Klinische Wochenschrift*, 1923, ii, 2235.

Histologic study of the umbilical cord in suspected congenital lues was proposed before the discovery of the *Spirocheta pallida*. Bondi held that edematous infiltration of the vessel walls, accompanied with emigration of polymorphonuclear leucocytes was pathognomonic. Mohn later showed that in cords showing such changes, spirochetes could always be demonstrated, especially in the wall of the vein.

Of late, many authors have described luetic ulcers of the navel in the newborn, in which spirochetes can always be demonstrated. This lesion may be the first, or indeed the only sign of syphilis.

The author used the dark-field method in his research, as it is relatively easy, and gives as satisfactory results as the more tedious histologic study. When the cord was ligated, a section 3 to 4 cm. long was cut from the fetal end, and from the end of this section nearest the child a scraping was made (discarding the first material secured), taking care to secure some material from the inner side of the wall of the vein. This was diluted with a drop of physiologic salt solution, mounted under a cover-glass (being careful to avoid air bubbles), and examined at once by the dark-field method. A total of 1,024 cases were studied, and these were divided into six groups. Group I included 703 consecutive, unselected cases, and all gave negative findings. Group II comprised 280 babies, whose mothers gave histories of one or more abortions or premature labors, but not of any other suspicious symptoms. All were negative. Group III consisted of 17 cases, with old treated maternal lues, or latent maternal syphilis with positive Wassermann reactions; also a few cases with apparently nonspecific positive reactions. No spirochetes were found. Group IV was made up of 15 macerated fetuses, but only three of the mothers had positive reactions. No spirochetes were found. Six babies were autopsied, and in none of them were luetic lesions found. Group V comprised 5 cases of mothers infected late in pregnancy, with fresh luetic lesions and the primary lesions still in evidence. The cords were negative. In Group VI there were 7 cases with spirochetes in the cords. Five mothers showed positive Wassermann reactions, one reacted positively once and was negative once, and in one case there was no report; five mothers had no luetic lesions. The diagnosis was confirmed clinically three times, and twice by autopsy. Two of the children were apparently perfectly well up to the time of the report.

The absence of spirochetes in the cords of the macerated fetuses was naturally puzzling. Positive findings in living children are of practical importance; however, the non-development of signs of lues in two of the children in Group VI is not compatible with the diagnosis of congenital lues. Negative findings (careful search being taken for granted) can be considered as eliminating lues. E. L. KING.

Vignes: Syphilis During Gestation and Confinement. *Paris médical*, 1924, xiv, 194.

Chancre of the vulva during pregnancy is not only larger, but more prolonged than at other times. Its color is bluish, resembling a pansy, or may be multi-colored. It is not affected by mercury but usually yields to arsenicals. Secondary lesions also have a tendency to hypertrophy, at times forming tumors of considerable size, which often excrete a considerable amount of serous exudate. Livid ulcers occur. Their duration also is prolonged, but usually they yield to salvarsan.

During delivery, syphilitic lesions of the vulvoperineal region render the tissues more friable, causing extensive lacerations. Chancre of the cervix may be discovered during delivery as a cause of dystocia. The cervix may be so firm as to

make delivery impossible. The fetus, already of low vitality, may succumb during a prolonged labor. Even incision of the cervix may render delivery impossible due to induration of the surrounding tissue so that cesarean section with hysterectomy may be necessary, even though there usually is little hope of saving the child.

In a woman recently infected who becomes pregnant, the general course of the disease, as well as of extragenital lesions, is not affected. However, a woman whose general health has been affected by syphilis usually becomes worse when pregnant. Also such symptoms as neuralgia, headaches, etc., are usually augmented. Vignes concedes the claims of Moore that in a woman infected coincident with impregnation, or during pregnancy, the disease may run a very mild course. He agrees with Williams, that a pregnant woman with lues may react more readily to treatment, but feels that these cases are the exceptions rather than the rule.

Vignes has not observed that pregnant women with latent syphilis are more prone to albuminuria or eclampsia, nor has he noticed any difference in the healing of abdominal wounds after cesarean section. He does not believe that puerperal infection is more common in leptic women, whether the disease be active or latent. Hydramnios and premature expulsion of a dead fetus should always suggest syphilis.

Vignes is quite emphatic in stating that the Wassermann reaction made with blood of pregnant women as well as from the cord of newborn infants, is unreliable. Not only may it be positive in the nonsyphilitic, but negative in the syphilitic.

R. E. WOBUS.

Mönckeberg, C., and Avilés, M.: *The Histopathology of Syphilitic Placentas and Its Clinical Importance*. *Gynécologie et Obstétrique*, 1924, ix, 419.

This article is based on a study of 50 syphilitic placentas. In all of the cases the placenta was friable, this being one of the causes of retention, a complication occurring in 50 per cent of these cases. Edema was almost constant, being manifested by an increase in the weight of the placenta. There was a difference in this respect between old and recent cases of syphilis, the weight ratio of the placenta to that of the fetus being almost normal in the first group. Infarcts were found in 16 per cent of the cases on microscopic examination, and the authors noted other microscopic characters as follows: Considerable diminution of blood lakes due to hypertrophy of the villi; irregular hypertrophy of the syncytial layer; proliferation of Langhans' cells; marked endarteritis and endophlebitis (80 per cent of cases), with a thickening of the tunica media and of the adventitia; dilatation and considerable increase in the number of vessels. These alterations of the blood vessels produce a defective irrigation; the cells which line the villi consequently degenerate easily, with the result that fibrin is deposited on them and several villi become glued together by the fibrin.

Decidua vera.—The lesions mentioned above are also present in this membrane. They explain its considerable thickening and particular friability. *Chorion*.—The connective tissue was infiltrated by embryonal cells. *Amnion*.—A more or less intense leucocytic infiltration of the connective tissue layer under the endothelium was observed. When this infiltration was not very marked there was an enormous multiplication of the endothelial cells, which assumed the appearance of the syncytium of the villi. *Umbilical cord*.—This was edematous in cases of maceration. An intense process of panarteritis and phlebitis was also much in evidence. In 36 per cent of the cases Wharton's jelly was infiltrated by leucocytes. The disturbances which these lesions cause in the nutrition and hematoses of the fetus are sufficient to account for the death of the embryo, which is so common in syphilis.

In cases of syphilitic abortions the lesions of the villi described above may not be found, or are so attenuated that they do not suffice to explain the death of the fetus; but in such cases there are always intense lesions of syphilitic endometritis in the decidua. When the fetus dies near term the placental lesions are not very grave, but there are always alterations in the vessels of the cord.

Syphilitic hydramnios may be conceived to be produced by several factors; placental lesions, increased tension in the fetal circulation due to enlargement of the fetal liver which compresses the portal vein and ductus venosus, lesions of the vessels of the cord and inflammation of the amniotic serous membrane.

Although the presence of spirochetes in the organs of syphilitic fetuses would lead one to suppose that they are also present in the placenta, they have rarely been found in this organ, owing to technical difficulties and to the fact that phagocytosis is more intense in the placenta than in any other organ. The authors themselves were unable to find spirochetes in any of the placentas which they examined.

FRED L. ADAIR.

Tvedegaard, G.: Fetal Syphilis. *Acta Gynecologica Scandinavica*, 1924, ii, Supplement, pp. 1 to 362.

Syphilitic endometritis was found by the author to be very common among women suffering from syphilis. No localizing symptom of this condition could be detected but it occurred with great regularity in patients who gave birth to children with congenital syphilis. The disease manifests itself as an intense and diffuse infiltration of the decidua basalis and parietalis with leucocytes which usually invade the chorion as well as the placenta.

The intensity of the endometritis corresponds to the number of spirochetes in the uterine blood and to the intensity of the disease in the fetus. The author maintains that once the disease has been established in the fetus it remains uninfluenced by treatment of the mother. This is due to the entire or almost entire lack of resistance of the fetal powers against infection. The power of resistance depends on the ability of the organism to produce reactive tissue, as for example wandering cells, granulation tissue or other proliferations. This reactive tissue is not found in young fetuses, hence, these fetuses die early and are stillborn. In the older fetuses there is reactive tissue, hence, these children are born alive. However, since the formation of the reactive tissue in the latter is very weak, these children die soon after birth. Due to the very weak power of resistance, fetuses show an extreme intensity of the disease as compared with their mothers and they show large numbers of, and very virulent, spirochetes.

All the fetuses which are infected early with syphilis die either at birth or shortly afterward because the disease has had a sufficient time before birth for complete development. Fetuses infected later are born alive in the incubation stage and in them the disease is much less serious than in the fetuses infected early in pregnancy. Symptoms, however, appear in the former before the end of the second month.

Pregnant women with syphilis should be treated throughout the entire pregnancy even though no symptoms are present, because women without symptoms infect their children just as often as those with symptoms. The treatment of the mother has no effect on the fetus and maternal antibodies do not pass over into the fetus. The disease in the fetus is acquired from the mother but is otherwise independent of the maternal disease.

J. P. GREENHILL.

Roberts, C. S. Lane: The Relation of Syphilis to Obstetrics. *British Medical Journal*, November 24, 1923, p. 971.

The author states that 10 per cent of all marriages involve a syphilitic individual, 75 per cent of all offspring in a syphilitic family are infected with syphilis,

and that 30 per cent of pregnancies in such families end in death of the fetus at or before term. Forty per cent of stillborn premature infants are syphilitic. Twenty-five per cent of all fetal deaths are caused by syphilis. Sixteen per cent of stillbirths are directly due to syphilis. Seventy-eight per cent of syphilitic infants born alive die in the first year, and the remaining 22 per cent die in early childhood.

The more unusual modes of infection may be classified as follows: prenatal infection of mother and child, intranatal infection of the child, postnatal infection of the child.

The author considers the relationship of syphilis to antenatal supervision. He also considers the prognosis as regards modification of the disease and the effect on the fetus. This is considered from the standpoint of the time during pregnancy at which infection took place, and the source of infection, the age of the disease in the transmitter, the parity of the mother, and the treatment used. The author also considers the effect of pregnancy on syphilis in the alteration of the Wassermann reaction and the protection from manifestations of the disease, the disturbance in time relations of the three stages of syphilis, the alteration from a typical response to infection, the production of a symptomatic neurosyphilis.

He also considers the effect of syphilis on pregnancy, the effect of syphilis on labor, the effect of syphilis on the puerperium. The author also considers the antenatal management, considering the difficulties of diagnosis and methods of treatment. He also considers the care of the syphilitic infant.

F. L. ADAIR.

Klaften and Kalman: Studies on Syphilis and Pregnancy. *Zeitschrift für Geburtshilfe und Gynäkologie*, 1923, lxxxvi, 123.

From a study of 96 luetic cases occurring in 5,738 births, the authors come to the following conclusions: Obstetrical clinics are given the opportunity to pick up unrecognized cases of latent lues. The Wassermann reaction is a valuable aid in recognizing these cases, and should be performed in every instance.

There does occur nonspecific positive reaction dependent upon pregnancy, yet among 912 carefully studied house cases, complete inhibition occurred in only one case. A swing to a negative reaction during the puerperium occurs not infrequently; in all such cases the Wassermann should be repeated.

Antiluetic therapy for both mother and child should be begun as early as possible.

MARGARET SCHULZE.

Lévy-Solal: Syphilis of the Ovum and Fetus. *Paris Médical*, 1923, xiii, 537.

That the ovum may be infected by the spermatozoa is possible, though not definitely proved. That the mother of such an infected fetus may remain free from syphilis, Lévy-Solal believes, is also possible as the mother may acquire an immunity by absorbing toxic products from the ovum. On the other hand, he thinks that most, if not all of these cases, are merely latent cases of maternal lues. That the fetus may be infected by the mother is beyond a doubt, yet the placenta seems a barrier to the passage of the spirochetes as they are not often found in large numbers in the placenta itself. At any rate, the fetus may be permeated with spirochetes and the mother free from active lesions and, while the placenta may be infected, it may on the other hand be entirely free from spirochetes.

Lévy-Solal believes that the virulence of the fetal infection depends somewhat on the time of gestation when infection actually takes place. If the ovum is infected very early, it simply dies and is expelled. The nearer to term the fetus is infected, he thinks, the more immune it has become to syphilis and may therefore be born apparently healthy.

He made a careful examination of a syphilitic fetus and found the most active lesions in the lungs and liver which he describes minutely. He shows that a fetus may present pathologic lesions of such severity as to be incompatible with life, points out on the other hand that these lesions may be so mild that, under treatment, perfect restitution is possible. In addition to the well-known lesions of the placenta, attention is called to the lesions of the membranes and of the cord.

Lévy-Solal finds that the more recent the infection of the parents, the more baneful the effect upon the offspring. Having observed the effect of treatment in connection with Pinard and Tzanek, he agrees with the former that treatment of the parents before conception is the ideal but that much can be accomplished by treating the mother after conception, provided the beginning of treatment is not too long delayed. Arsenical medication proves more beneficial than mercurial and as a rule two or three series of from seven to nine large doses of arsenobenzol are administered.

R. E. WOBUS.

Nathanson: Syphilis in Relation to Pregnancy. Surgery, Gynecology and Obstetrics, 1925, xli, 320.

Syphilis was diagnosed in 2.90 per cent of 413 pregnant women, which fairly agrees with the incidence of 3 to 4 per cent reported by other investigators. The performance of routine Wassermann test in pregnancy constitutes a most valuable diagnostic procedure. Colles' law has neither been conclusively proved nor disproved. The finding of a positive Wassermann in the mother during pregnancy does not necessarily mean that the child will develop syphilis. Routine microscopic study of the placenta for evidences of Fraenkel's disease affords more conclusive evidence as to the presence or absence of syphilis than does serologic investigation. Syphilis is not an important factor in the production of abortions in the first trimester of pregnancy, and it has little influence on the incidence of miscarriages during the second trimester but it is the commonest single cause of premature births and stillbirths in the last trimester. If a diagnosis of maternal syphilis is made, the patient should be intensively treated along appropriate lines irrespective of the duration of pregnancy. Every infant showing signs of congenital lues should receive antiluetic treatment, and should be kept under surveillance for a long period of time. Extreme caution should be exercised in choosing a wet-nurse for an apparently nonsyphilitic infant, and similarly no syphilitic child should be nursed by a nonsyphilitic woman. The author closes his paper with the plea that all departments of medicine should cooperate in an effort to combat the incidence of syphilis in pregnancy with its resultant economic burden upon the state, and its great waste of human life.

WM. C. HENSKE.

Fischl: Profeta's Immunity. Monatschrift für Kinderheilkunde, 1923, xxv, 110.

It is now quite generally accepted that the seeming "immunity" of the mothers of hereditary syphilitic children (Colles' law) in reality depends not on immunity but on the presence of a latent syphilis in the mother. It might be inferred that Profeta's law ("a nonsyphilitic child born of syphilitic parents is immune") could be similarly explained. A review of numerous studies reveals a wide divergence of opinion on the subject and this is the reason for the present contribution. Thirty-three mothers with frank syphilitic symptoms, and nursing their children at the breast, were observed for periods ranging from one and one-half to fourteen months. The Wassermann reaction in the mothers was positive in nine cases, negative in six, and "variable" (at times positive and at others, negative) in sixteen. In the children, the Wassermann was constantly negative in twenty-five cases, and variable in eight. The reaction was repeated in mothers and children, up to ten or twelve times. Fifteen of the women had never been treated and the rest in-

sufficiently. The children looked healthy and appeared to thrive, and it would seem that immunization had occurred, probably through the breast milk. In one case, a syphilis-like rash appeared for one day only, and the Wassermann was positive on this day, but negative before and after—possibly this was an abortive syphilis.

T. C. HEMPELMANN.

Thompson, Warren: Syphilitic Backache. American Journal of the Medical Sciences, 1922, clxiv, 1.

The author cites two cases in which the diagnosis was certain and benefit from specific treatment evident. He states that syphilis of the spinal column while rare is no doubt frequently overlooked and should be thought of in the etiology of backache when no other cause can be discovered. The lesion is usually in the cervical or lumbar regions. The clinical picture is indefinite, although backache worse at night gives a clue. The pathology is the same as in bone syphilis elsewhere in the body. *Antispecific treatment is curative.*

WM. KERWIN.

Portis, Bernard: Syphilis of the Uterus and Adnexa. Surgery, Gynecology and Obstetrics, 1923, xxxvii, 37.

After calling attention to the infrequency with which any syphilitic lesions of the female generative tract are observed and the lack of uniformity of the histologic descriptions in the literature, this author reports specific changes in the cervix, body of the uterus and ovary of a patient upon whom a panhysterectomy was done. The diagnosis was corroborated in each site by the demonstration of treponema stained by the Levaditi method. The author states that this was the first conclusive diagnostic proof of syphilis in a series of 1366 uteri subjected to pathologic study.

Because the arteritis and sclerosis were less well marked than the lymphatic invasion, and because the secondary eruption appeared after operation, the opinion is expressed that the invasion in this instance was recent and ascending by way of the lymph channels from a chancre on the cervix. Specific processes of a more chronic nature and the changes following repeated involution can less readily be differentiated.

CREADICK.

Books Received

THERAPY OF PUERPERAL FEVER. By Dr. Robert Koehler, Vienna. American edition prepared by Dr. Hugo Ehrenfest, St. Louis. With 27 illustrations. St. Louis, The C. V. Mosby Company, 1925.

DISEASES OF CHILDREN. By the late Sir James Frederic Goodhart. Twelfth edition, by George Frederic Still, professor of diseases of children, King's College, London, etc. With 68 illustrations. Philadelphia, Lea & Febiger, 1926.

ANNUAL REPORT OF THE SURGEON GENERAL OF THE PUBLIC HEALTH SERVICE OF THE UNITED STATES. For the fiscal year 1925. Washington, Government Printing Press, 1925.

SUITES DE COUCHES NORMALES ET PATHOLOGIQUES. Par E. A. Rene de Cotret, accoucheur en chef de la Maternité, etc. Montreal, La Cie d'Imprimerie Godin, Montreal. 1919.

L'OBSTETRIQUE DES GARDS-MALADES. Par E. A. Rene de Cotret, professeur de clinique obstétricale à la faculté de médecine, etc. Montreal. 1925.

PYGMALION, or the Doctor of the Future. By R. M. Wilson, M.B., Ch.B., New York, E. P. Dutton & Company. 1925.

RATIONAL GLAND THERAPY FOR WOMEN, particularly in relation to menstruation. By I. Wanless Dickson. London, H. K. Lewis & Co. 1926.

OPERATIVE SURGERY. By J. Shelton Horsley, M.D. Attending surgeon St. Elizabeth Hospital, Richmond, Va. With 666 original illustrations. Second edition. St. Louis, The C. V. Mosby, 1924.

OPERATIVE CYSTOSCOPY. By E. Canny Ryall, F.R.C.S. Senior surgeon to ALL Saints' Hospital for Genito-Urinary Diseases, London. With 115 plates containing 670 original illustrations of which 528 are colored. St. Louis, The C. V. Mosby Company, 1925.

TUMORS OF THE COLON AND RECTUM. Their pathology, diagnosis and treatment. By Jerome M. Lynch, surgical director, St. Bartholomew's Hospital, N. Y. and Joseph Felsen, attending pathologist, St. Bartholomew's Hospital. Paul Hoeber, Inc., New York, 1925.

MODERN VIEWS ON THE TOXEMIAS OF PREGNANCY. By O. L. V. de Wesselow, chemical pathologist, St. Thomas' Hospital and J. M. Wyatt, obstetric physician in charge of out-patients, St. Thomas's Hospital, London. Paul B. Hoeber, Inc., New York, 1925.

BIOLOGIE UND PATHOLOGIE DES WEIBES. Herausgegeben von Professor Josef Halban, Wien, und Professor Ludwig Seitz, Frankfurt a.M. Lieferungen 18, 19 und 20. Urban & Schwarzenberg, Berlin. 1925.

GEBURTSHIFLICHES BREVIER fuer Aerzte und Studierende. Von Dr. Franz Eberhart in Baden-Baden. Urban & Schwarzenberg, Berlin, 1925.

BIRTH CONTROL. Facts and Responsibilities. By Adolph Meyer, M.D. The Johns Hopkins Hospital. The Williams & Wilkins Co., Baltimore, 1925.

AN INTRODUCTION TO SEXUAL PHYSIOLOGY, for biological, medical and agricultural students. By F. H. A. Marshall, F.R.S. Longmans, Green & Co., New York, 1925.

The American Journal of Obstetrics and Gynecology

VOL. XI

ST. LOUIS, MARCH, 1926

No. 3

Original Communications

SHOCK IN THE PREGNANT AND PUERPERAL WOMAN*

BY HAROLD BAILEY, M.D., AND WILLIAM P. DRISCOLL, M.D.,
NEW YORK, N. Y.

NO special study has been made of shock in obstetric conditions, principally because of its low incidence and apparently evident cause,—hemorrhage. Considerable effort, some of it successful, has been expended in the prevention and control of blood loss, but if we are to reduce further the maternal mortality at childbirth our study must be directed toward the correct interpretation of acute collapse, the elucidation of circumstances attending its origin and the treatment of the condition per se.

The work on traumatic shock of the National Research Council of Great Britain and of Walter B. Cannon¹ and his associates was of inestimable value in war surgery and now bids fair to be of continued value in the surgery of civil life. The obstetrician must correlate his management of cases of collapse with the suggestions offered by these physiologists and demonstrated innumerable times as practical and life-saving.

It is not difficult to show that shock comprises a considerable percentage of the complications that lead to death in labor. The protection of the mother is the chief aim of prenatal care and every effort is made to bring the woman to the conclusion of her pregnancy with her body free from specific toxemia and to provide an environment where asepsis at delivery is assured. These conditions may be fulfilled and have been, in certain groups of cases, but careful review of the death rate shows that with the reduction of deaths from toxemia and sepsis, there still remains about 50 per cent due to accidents of labor, and this figure has been considered an apparently irreducible minimum.

*Read at a meeting of the Buffalo Academy of Medicine, October, 1925.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

In the last 2323 cases of the Maternity Center Association there were five maternal deaths or one in 464 cases. Two of the patients died of primary shock following blood loss; a third patient died within three hours of delivery and although death was attributed to pulmonary embolism it was probably due to injury and shock. Three-fifths of the deaths, then, may be ascribed to the development of shock.

In the 1477 deliveries on the Bellevue Hospital service during the past two years (six months service in each year) which form the basis of this paper, we can attribute 37 per cent of the deaths to conditions that ended in shock.

In opening our discussion we wish to have it thoroughly understood that we are not considering the mild anemias following the loss of 1000 c.c. of blood neither are we speaking of the patient who exhibits a rapid pulse and blanching of the skin after operative delivery. Both of these conditions may be a mild form of collapse, but our problem deals with the cases in which complete shock occurs. When shock develops, the patient either suddenly, or gradually in the course of an hour or two, acquires a rapid, thready or imperceptible pulse; there is a lowering of the systolic blood pressure to a point somewhere between 80 and 40 mm. of mercury, and, coincident with the lowering of the arterial pressure, there is a diminution in the CO_2 combining power of the blood. There is a blanching and sweating of the skin, with pale mucous membranes and a lapse into a partially conscious state, progressing to unconsciousness. During the development of the shock there may be deep respirations or so-called air-hunger. Occasionally there is present an element of nervous excitement and fear. Without treatment, death invariably ensues.

These symptoms are usually classed as signs of hemorrhage, but we wish to point out that they are signs of shock and may occur in cases in which there is no loss of blood from the vessels. Cannon,² in investigating shock in injured soldiers found that many of them had lost no blood or only small amounts; yet gradually after an hour or so, during their transfer to the rear lines, they lapsed into a state similar to that shown by the men who had bled freely and developed immediate syncope. In traumatic shock, he termed the collapse that occurs in patients exhibiting excessive hemorrhage *primary shock*, and he classified as *secondary shock* the gradual collapse that developed in patients suffering trauma with but little hemorrhage. He found that in the latter group the blood count taken from the skin surface was higher than a simultaneous count of blood from a vein and that both were above the normal, and he concluded that a concentration of the blood occurs in the superficial capillaries. In abdominal operations where shock ensues there is no evident dilatation of the venous system of the splanchnic area and, therefore, there can hardly be vasomotor paralysis as an etiologic factor. In traumatic and surgical shock it may be conceded

that there is no central vasomotor origin, but in obstetrics we have complicating conditions that, by acidosis and perhaps even specific toxins, produce a deleterious effect on the centers.

We present an outline, giving the varieties of primary and secondary shock seen by us.

I. Surgical Shock

- a. Hemorrhage
- b. Intraperitoneal Irritation and Hemorrhage
- c. Traumatism to an Organ
- d. Distention of an Organ

II. Acidosis and Exhaustion Shock

- a. Acidosis
- b. Heart Depression

III. Vasomotor Shock

- a. Drugs
- b. Eclampsia
- c. Chronic Nephritis

I. SURGICAL SHOCK

a. *Hemorrhage*.—In hemorrhage during labor or immediately postpartum and especially in cases of placenta previa, there may be such a rapid and free loss of blood that the patient is at once exsanguinated and dies within a few minutes. However, in the majority of the bleeding cases in which shock occurs, the patient loses from 1500 to 2500 c.c. of blood and there is an immediate anemia followed by a gradual lapse into shock which if untreated results in death within a few hours.

Cannon³ has shown in animals that a first hemorrhage of 20 per cent depresses the blood pressure but that it rises again at once. A second loss of 10 per cent causes depression and there is still a tendency to return to normal. Following a third loss of 10 per cent or a total of 40 per cent, the animal drops into shock and dies. These results are applicable in obstetrics. Patients may bleed before their admission to the hospital, and in such cases the history is of the utmost importance for it is essential that the operator keep in mind that even a small further loss of blood may be fatal.

Primary Shock, Secondary Hemorrhage

CASE 1.—Bellevue Hospital. A. N., age twenty-four, para ix. April 11, 1925. Complete placenta previa. This patient was admitted with a history of bleeding at home. Her blood pressure was 120/70. An extraovular bag was inserted at 5 P.M. and expelled at 9:50 P.M. Version and breech extraction were done immediately, and a living child, 3100 grams, was delivered.

There was considerable bleeding during the delivery. The placenta was expressed at once; pituitrin was given, and the uterus and vagina were packed with gauze. The patient was in deep shock, progressing to unconsciousness.

Two thousand c.c. of saline were given by hypodermoclysis and thirty minutes after

the delivery, 250 c.c. of gum glucose was injected in a vein. The patient improved, came out of the coma, and was able to talk rationally. In the interval a donor had been procured and transfusion was about to be started when she had a secondary hemorrhage behind the packing which resulted in its expulsion. She died within a few minutes.

NOTE.—In this particular case we were not able to obtain blood pressure readings because the patient was pulseless after the delivery.

Primary Shock, Excessive Hemorrhage

CASE 2.—Bellevue School for Midwives. M. K., para ii. July 9, 1925. Inversion of the uterus. With her first labor, this patient had an adherent placenta and postpartum hemorrhage and was transfused on the Bellevue service. The present delivery was normal and without an anesthetic.

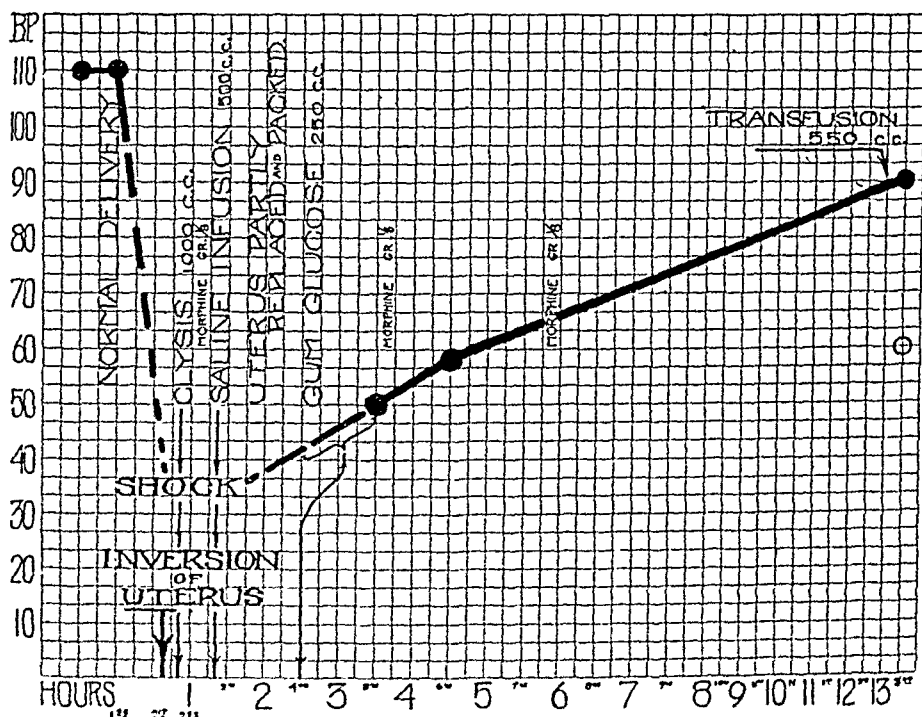


Chart I.—Case 2. Primary shock. Excessive hemorrhage. Inversion of the uterus.

The delivery took place at 1:35 A.M. At 2:10 A.M. hemorrhage occurred, and attempts were made to expel the placenta by the Credé method. This was followed by a complete inversion of the uterus with the placenta still attached. There was immediately excessive hemorrhage and the patient went into collapse. She was pulseless, and the systolic blood pressure could not be determined. Her respiration became very slow, and it appeared as though she were in a dying condition.

Stimulants were given and also 4 mm. of Magendie's solution. At 2:30 A.M. she was given hypodermoclysis of 1,000 c.c. of saline and intravenous injection of 500 c.c. of saline. The uterus was partly reduced and replaced within the vagina and ten yards of gauze packed about it. At 4 A.M. 250 c.c. of gum glucose solution was injected intravenously, and at 5 A.M. the systolic blood pressure was 50 mm.; $\frac{1}{8}$ gr. morphine was given, and two hours later $\frac{1}{8}$ gr. At 6 A.M. the blood pressure was 60 mm. The patient continued to improve, and at 3 P.M. her blood pressure was 90 and the blood count was R. B. C., 1,600,000; Hg., 30 per cent; a transfusion of 550 c.c. blood was given by the Unger method.

Two days later the blood count was R. B. C. 2,960,000; Hg., 50 per cent. During

the puerperium the blood pressure averaged above 100. One month later she was transferred to the Gynecologic side and a Spinelli operation was done on a well involuted, inverted uterus. Following this operation it was again necessary to transfuse her. The patient ultimately recovered.

Secondary Shock, Postpartum Hemorrhage with Retained Placenta

CASE 3.—Bellevue Hospital. L. B. Para iii. May 19, 1925. This patient was delivered by a midwife at 10:30 P.M. on May 18. The placenta was retained and the patient gradually became exsanguinated from loss of blood. A doctor was called who attempted to remove the placenta but was unsuccessful.

The patient was admitted to the hospital at 2:10 A.M. with a systolic blood pressure of 40; the diastolic could not be determined. Her pulse was thready and the skin cold and clammy. There was no active bleeding. She was given 1,000 c.c. of saline solution by hypodermoclysis and at 3 A.M. an injection of 275 c.c. of gum

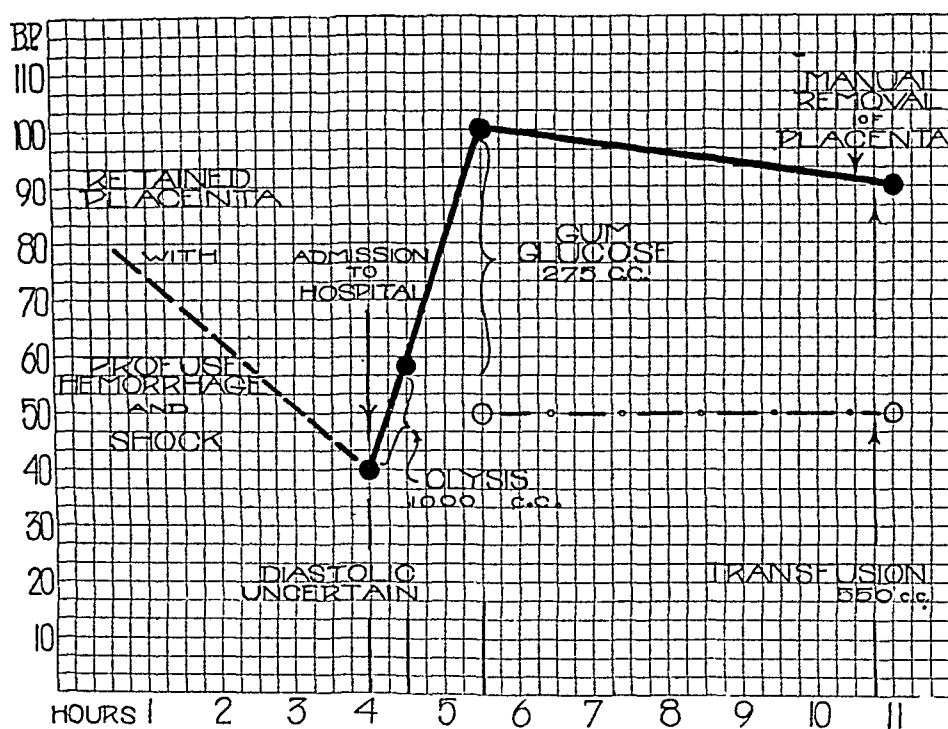


Chart II.—Case 3. Secondary shock. Postpartum hemorrhage with retained placenta.

glucose was started. This brought the blood pressure to 100/50 and her general condition improved. At 11 A.M. seven hours after the beginning of the intravenous medication, the systolic blood pressure was 90.

The placenta was then manually removed with some difficulty. The uterus and vagina were packed with iodoform gauze, and the patient was given a 550 c.c. transfusion by the Unger method. Two days after the transfusion, the blood count was R. B. C., 3,240,000; Hg., 50 per cent.

There was a low grade temperature with foul lochia for ten days. Otherwise the puerperium was uneventful and patient was discharged on the 18th day.

b. *Intraperitoneal Irritation and Bleeding.*—This condition is seen most frequently in ectopic pregnancies. The abdomen may become filled with blood, and primary shock, due to actual blood loss, results. There may be, however, little intraperitoneal bleeding, and yet the patient will exhibit typical symptoms of shock.

Secondary Shock, Ectopic Pregnancy

CASE 4.—Private case of a member of our teaching group. Nursery and Childs' Hospital. May 20, 1925. This patient had a mass in the pelvis which appeared to be an incarcerated pregnant uterus. At 10 A.M. she was examined under anesthesia, and a mass the size of a three months' pregnancy pushed above the promontory of the sacrum.

At 11 A.M. the patient's pulse became rapid and at 3:15 P.M. when she was seen by us in consultation, she was in profound collapse. She was removed to the operating room but her blood pressure was so low that it was considered inadvisable to open the abdomen until her condition improved. Morphine was given and instillations of tap water by rectum. At 3:30 P.M. 1,000 c.c. of saline was given by hypodermoclysis, under the breasts. At 5:30 P.M. gum glucose injection was started, and after twenty minutes the patient was anesthetized, and the abdomen opened.

There was very little blood within the abdominal cavity, but the mass below proved to be a three months' ectopic pregnancy, in the sac of which there was about a cupful of blood. The fetus and the placenta were removed and packing inserted to check the oozing and to insure drainage through the vagina. At the end of the operation the gum glucose was still going through the veins and the patient was in fair condition with a rapid, feeble pulse. There was some difficulty in procuring a donor and at 7 P.M. 700 c.c. of saline was given by hypodermoclysis. At 8:30 P.M. 750 c.c. of blood was given by transfusion.

The recovery was uneventful. The blood pressure on the day following the operation was 106/70.

c. *Traumatism to an Organ.*—Under this heading we refer chiefly to rupture of the uterus. In rupture of the lower uterine segment that does not extend more than one or two centimeters beyond the vaginal vault there may be little or no external bleeding, although there is often as much as 100 to 200 c.c. of blood in the broad ligament. These tears are usually the result of high forceps application to a head that has not passed through the cervix, and the injury is apt to cause secondary shock. Complete rupture with the tears through the peritoneal coat are likely to be accompanied by excessive intraperitoneal hemorrhage and primary shock. Many injuries of this type are accompanied by hemorrhage, and it is a question which factor, traumatism or hemorrhage, is the more important.

Secondary Shock, No Hemorrhage. Rupture of the Lower Uterine Segment

CASE 5.—Bellevue Hospital. M. C. Age forty. Para x. March 27, 1925. This patient was delivered by version at 2 P.M., on the outdoor service of the Bellevue School for Midwives. There was only the ordinary bleeding following the delivery, and the placenta remained within the uterus. The visiting doctor left the patient in charge of an interne who called him back an hour and a half later.

He found that there had been no bleeding, but the placenta was still within the uterus and the patient in shock. He had her brought to the hospital in an ambulance; she arrived there three and a half hours after the delivery of the child. Her pulse was so thready in character that it could not be determined. Her blood pressure was 40. The blood count showed R. B. C., 3,680,000; Hg., 78 per cent.

At 6 P.M. morphine was given, and at 6:50, 250 c.c. of gum glucose was injected in a vein. About an hour afterward her blood pressure was 108/80, her pulse 160 but of better volume. At 7:15 P.M. the placenta was manually removed, and

it was then found that there was a rupture extending into the broad ligament. Vaginal packing was inserted. At 8:15 P.M. 660 c.c. of blood was given by transfusion. Following this the blood pressure rose to 110/80. At 9:45 P.M. or seven and a half hours after the delivery of the child, hysterectomy was done. There was less than an ounce of blood within the abdomen, but there was a blood clot of about 200 c.c. within the folds of the left broad ligament. There was marked torsion of the uterus to the right. Following the hysterectomy, 1,000 c.c. of saline was given by hypodermoclysis. The patient was returned to the ward in fair condition.

At 1 A.M. she again went into syncope of short duration. Her systolic blood pressure was 68. Morphine was given and at 4:30 A.M. the blood pressure was 94/64. At 7 A.M. or seventeen hours after the delivery the blood pressure was 130/78. The blood count was R. B. C., 3,410,000; Hg., 60 per cent. We believe that when the patient went into syncope at 1 A.M. the probable cause was a pul-

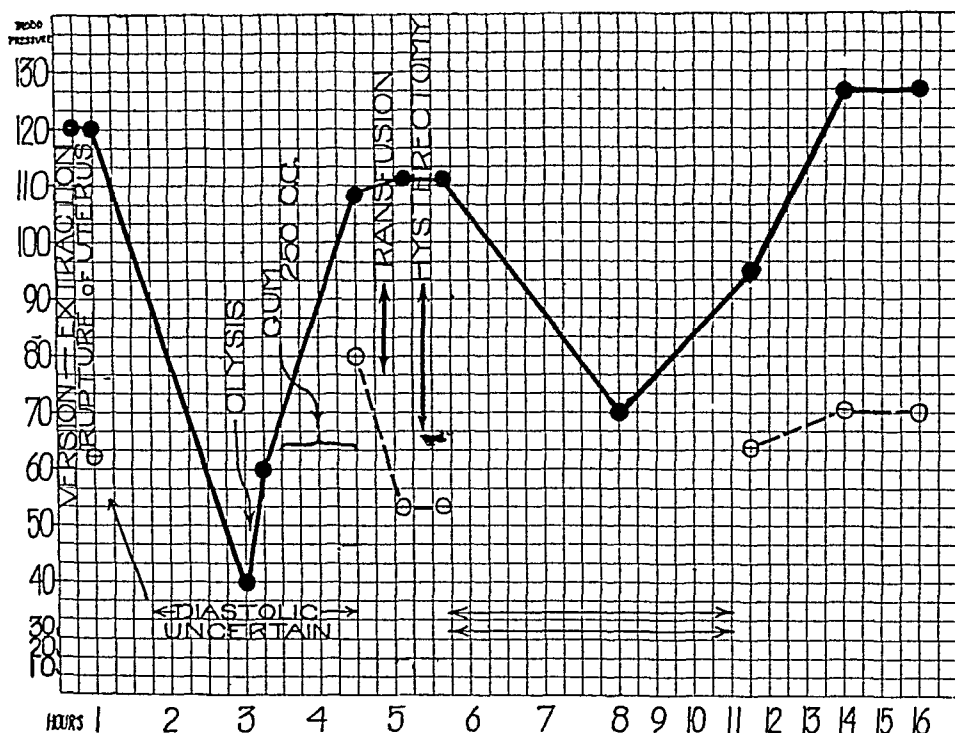


Chart III.—Case 5. Secondary shock. No hemorrhage. Rupture of the lower uterine segment.

monary embolism as she had marked congestion of the lungs with cyanosis on the following day. She died on the night of the second day.

Secondary Shock, Complete Rupture of the Uterus with Intraperitoneal Hemorrhage

CASE 6.—Bellevue Hospital. T. M. Age forty. Para iv. April 10, 1925. This patient was five months' pregnant and was admitted to the hospital with a diagnosis of threatened abortion. She remained in the ward fourteen days with no hemorrhage and few symptoms. On her way to the examining room to be examined for discharge she had a sudden sharp pain in her lower abdomen. The pain persisted for three to four hours and at 4 P.M. it was evident that the patient was in mild shock. At 4:30 her blood pressure was 80/44. A provisional diagnosis of ruptured ectopic pregnancy was made.

One thousand c.c. of saline was given by hypodermoclysis. At 5:30 P.M. she was given 250 c.c. of gum glucose. At 6:30 P.M. her blood pressure was 106/40 and her general condition such that the abdomen could be opened.

The abdominal cavity was found to be filled with blood and the entire posterior wall of the five months' uterus was ruptured, with the placenta lying in the tear and adherent to the uterus. The organ was removed by supravaginal hysterectomy. Following the operation, 600 c.c. of blood was given by transfusion. At the end of this time the blood pressure was 106/40. The recovery was uneventful.

d. *Distention of an Organ.*—We have two cases in this group, one a case of distention of the uterus from the concealed hemorrhage of a premature separation of the placenta, and the other, a case of distention of the stomach following an operative delivery. A third type which, though rare, might be mentioned, occurs with acute polyhydramnios at about the seventh month. The only example of this that we

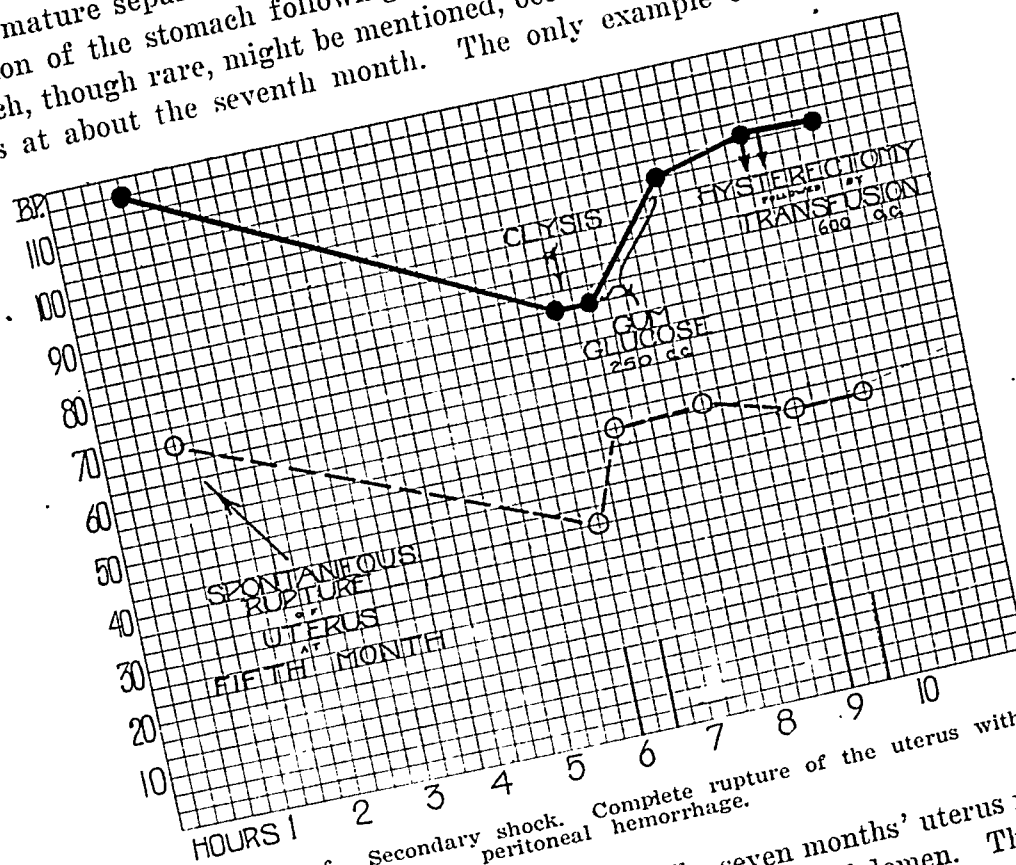


Chart IV.—Case 6. Secondary shock. Complete rupture of the uterus with intra-peritoneal hemorrhage.

have seen occurred several years ago. The seven months' uterus reached to the ribs on both sides and appeared to fill the abdomen. The shock was mild and may possibly have been due to difficult respiration. The membranes were ruptured with a pin-point opening, and there was a very gradual and complete emptying of the uterus. The only other treatment that the patient received was the administration of morphine.

Primary Shock, Distention of the Uterus

CASE 7.—Bellevue Hospital. I. B. Age twenty-four. Para i. February 2, 1925. This patient was seven months pregnant and was admitted from the out-door clinic with albumin 3-plus and blood pressure of 170/110. She remained in the ward twenty-two days, under medical treatment, and appeared to improve although there was still albumin in the urine and the blood pressure was 130/95. At 10 A.M. February 26, the patient was having contractions every three minutes.

She began to have slight vaginal bleeding and lapsed gradually into shock. On examination the uterus was found to be ligneous in its consistency. The blood count was R. B. C., 3,520,000; Hg., 60 per cent.

Morphine was given, and 1,000 c.c. of saline by hypodermoclysis. The membranes were ruptured artificially and a No. 5 bag inserted at 11 A.M. At 1:25 P.M. a stillborn baby was delivered spontaneously. The placenta was expressed and found to have blood clots adherent to its entire surface. Although there was no further bleeding, as a precautionary measure, the uterus was packed with iodoform gauze. Two hours later, as soon as a donor could be procured, 520 c.c. of blood was given by transfusion. Before the transfusion the blood pressure was 112/90. Two hours later it was 132/92. The following day the R. B. C. were 4,400,000; Hg., 78 per cent.

The recovery was uneventful.

Primary Shock, Mild. Acute Distention of the Stomach

CASE 8.—Private case of one of the authors. November 2, 1924. Para i. The patient had had a Simpson operation for retroflexion. The membranes ruptured spontaneously two weeks before term. The labor lasted twelve hours and ended with a forceps delivery. A perineal tear had to be repaired. Ether was used for the anesthetic.

Immediately following the delivery of the placenta the upper part of the abdomen became greatly distended and the patient began to drool coffee ground vomitus. There was a very large quantity of this,—at least a quart. The pulse became rapid and of low tension. The foot of the table was raised and vigorous pressure made on the upper part of the abdomen by means of a binder. Tap water was given by rectum and morphine as soon as she was out of the ether. No further treatment was necessary.

NOTE.—This case is inserted here merely as a matter of record as not more than twelve or fifteen such cases, immediately following vaginal delivery, are to be found in the literature.

II. ACIDOSIS AND EXHAUSTION SHOCK

a. *Acidosis*.—We have indicated in the first part of the paper that patients in labor are particularly susceptible to shock because of the fact that they have an acidosis which is represented by a lowered carbon dioxide content of the blood. This low content is attributed to several factors. In the first place the pain produces deep respiration with increased elimination of the CO_2 . Instead of the CO_2 combining power of 55 to 70 which is normal in nonpregnant women, 44 or even a lower figure has been shown by a number of observers to be the average in pregnant women. A. C. Williamson⁴ has shown that in labor the alkali reserve as represented by the CO_2 content of the blood may be as low as 32 and we give a chart of Williamson's which illustrates this point.

Secondly, an increase in the acidosis is caused by the starvation that obtains during a long labor or one that extends over twenty-four hours. The starvation occurs at a time when the muscular energy expended is extreme. There are, also, waste products from muscular contractions, i.e., lactic acid, etc., that require alkali for their neutralization. In cases developing secondary inertia during the course of the labor it is

well to remember that acidosis is undoubtedly present and should be considered before operative procedure is contemplated. It is generally conceded that ether and chloroform and nitrous oxide without the correct proportion of oxygen decrease the CO_2 content of the blood.

Cannon⁵ has shown that there is a coincident lowering of the blood pressure and the CO_2 . Many of the obstetric cases have a systolic blood pressure between 90 and 100 during the last month of pregnancy.

The summation of these factors renders the patient a poor operative risk.

Acidosis Shock

CASE 9.—Bellevue Hospital. S. T. Age twenty-two. Para i. March 15, 1925. This patient was in labor thirty hours, twenty-four in the hands of a midwife who noticed that the woman was becoming prostrated and advised hospitalization. On

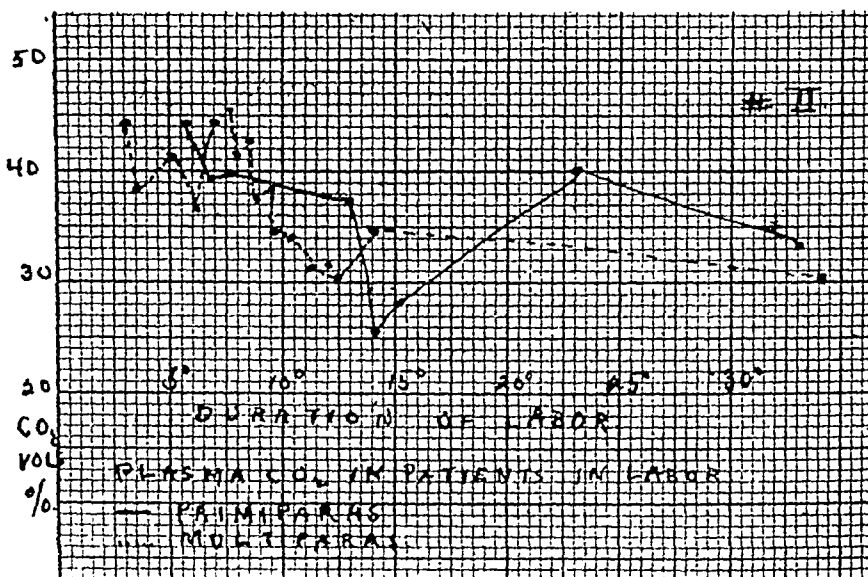


Chart V.—Shows variation of plasma CO_2 during labor.
(From paper by A. C. Williamson)

her arrival at the hospital, her pulse was 132. The membranes had been artificially ruptured twenty-four hours previously. The position was L. O. A. with the head high in the pelvis. The cervix was not more than four fingers dilated.

The labor was allowed to continue for six hours longer at the end of which time the patient was in a state of secondary inertia with the cervix completely dilated. A living child was easily delivered by axis-traction forceps. Ether anesthesia was used. At the end of the operation, although the procedure was short, the patient was in shock. Her pulse was over 170. There was only the ordinary bleeding.

One thousand c.c. of saline was given by hypodermoclysis under the breasts. Tap water was given by rectum. The head of the table was lowered. At the end of two hours the improvement was decided and nothing further was done. The patient continued to have a rapid pulse for the next six hours and it was above normal for four days.

The remainder of the puerperium was normal and the patient was discharged with her baby on the tenth day.

b. *Heart Depression*.—Yandell Henderson,⁶ in 1909, indicated that pain may lead to fatal apnea owing to the fact that with the pains there is excessive pulmonary ventilation and a loss of what he terms the protective CO_2 . With the loss of the CO_2 which stimulates the respiratory center, death may occur suddenly from respiratory failure. Conversely, pain may stimulate the centers, and sudden relief from pain may leave them without the stimulating factor and death result. He refers to Crile's paper of 1896 which describes shock in animals and quotes him, stating that in 103 experiments in which exact determinations were recorded, respiration alone failed in 90, the heart in four and both simultaneously in nine.

In his description of the loss of the CO_2 content of the blood, A. C. Williamson⁷ suggests that, in obstetrics, a number of the so-called sudden anesthetic deaths may be in reality deaths of an acidotic nature, preventable if due regard is given the factor of the lowered CO_2 tension.

Primary Shock, Heart Depression. Anesthetic Death

CASE 10.—Bellevue Hospital. M. R. Age forty. Para i. May 21, 1925. Toxemia of pregnancy and chronic nephritis. On admission this patient had a blood pressure of 160/110 and 4-plus albumin in the urine.

On May 25, a No. 4 Voorhees bag was inserted and expelled twenty-six hours later. The membranes were ruptured artificially, and the cervix was found to be four fingers dilated and soft. Instead of delivering the patient, she was allowed to await the development of forcible contractions. Another twenty-eight hours passed and then it was decided to apply the forceps for an R. O. P. position. The patient was in an exhausted state and throughout the labor had been filled with fear, repeatedly saying that she was going to die.

Ether was started by the drop method in an open cone. The patient was prepared in about ten minutes, but before the operator could insert the forceps she ceased to breathe, and her heart stopped at the same time. A total of two ounces of ether was used. A living baby was delivered by high forceps immediately after the patient's death.

The autopsy showed chronic interstitial nephritis and a chronic cardiac condition which was not recognized during life, as the patient's heart was compensated.

Primary Shock, Heart Depression. Anesthetic Death

CASE 11.—Manhattan Maternity Hospital. January 31, 1924. This case was on the outdoor service of the Berwind Maternity Clinic. The patient had a simple flat pelvis of moderate degree and after thirty-six hours of labor she went into secondary inertia with the head moulded into the inlet.

She was given morphine, but the pains continued with mild force. After thirty-eight hours of labor she was referred to the Manhattan Hospital for operation by a member of our teaching group. Ether was used as the anesthetic. As soon as the abdomen was opened the patient's respiration ceased. The heart pulsated for a moment or two. She was treated by artificial respiration, massage of the heart, through the diaphragm, and injections of adrenalin into the heart muscle, all of which proved to be of no aid. The autopsy findings were negative.

The child was delivered at once but although the heart was beating, it could not be resuscitated.

III. VASOMOTOR SHOCK

a. *Drugs.*—In traumatic shock it is quite evident that vasomotor paralysis is not an etiologic factor. Cannon's evidence would lead to the conclusion that the vasomotor center is not paralyzed but stimulated, leading to constriction of the vessels, and that in the late stages of abdominal shock in animals where the pressure is as low as 50 mm. of mercury, there is some tone to the blood vessels indicating that the vasomotor centers are still active. However, no one would deny that the vasomotor tone could be so reduced by toxic drugs that the patient would lapse into shock and die through embarrassment of the right heart. In 1910 we had a case representing this type of shock. (Bailey, *Shock in Eclampsia*.⁸)

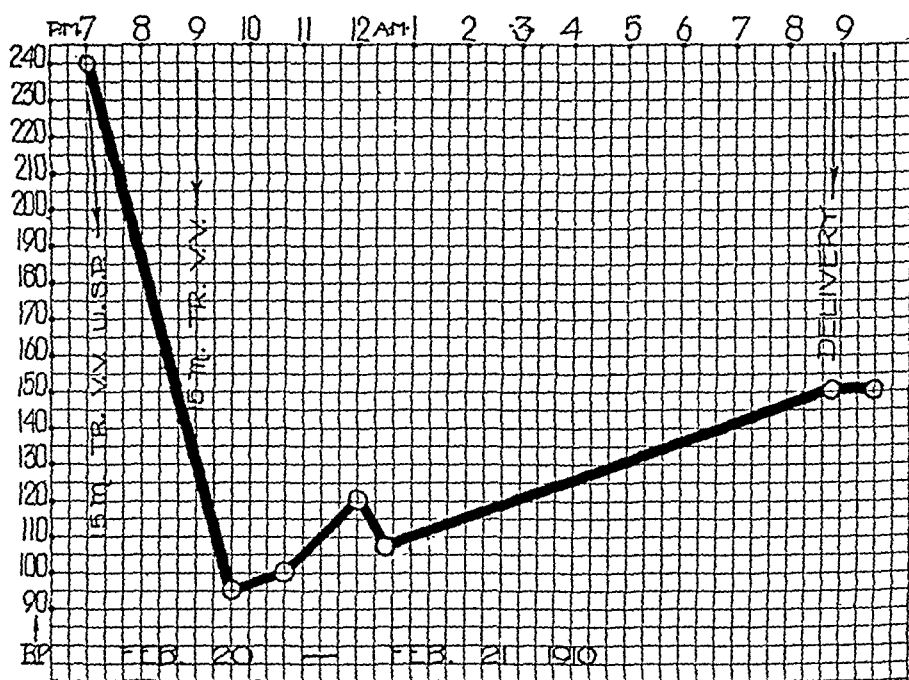


Chart VI.—Case 12. Vasomotor shock. Preeclampsia.

Vasomotor Shock, Action of Veratrum Viride on Vasomotor Center

CASE 12.—Manhattan Maternity Hospital. M. H. Age twenty-one. Para i. February 20, 1910. On admission there were albumin and casts in the urine and the blood pressure was 240. As the patient was entering labor it was felt that it would be advisable to give her Veratrum to lower the blood pressure. She received by hypodermic injection 15 mm. of U. S. P. tincture of Veratrum viride and this dose was repeated at 9 P.M. At the time of the administration of the second dose she complained of nausea but her pulse was not slow.

Forty-five minutes later she became semiconscious; her extremities were cold and perspiring, and there was constant drooling of frothy saliva. Her pulse was 60, her respiration 45 and the pupils of her eyes were widely dilated. At 9:45 P.M. the blood pressure was 95—a drop of 145 mm. of mercury in the course of three hours.

The collapse was treated by inverting the patient, an assistant standing on the

table and holding her legs against his shoulders. While the patient was thus inverted her legs were tightly bandaged. One-eighth of a grain of morphine was given and the dose repeated in half an hour. Ten mm. of adrenalin was injected every ten minutes for a number of doses, and one-thirtieth of a grain of strychnine was given. The patient gradually returned to a better condition. One hour later the blood pressure was 120 and at the end of the next hour 105 with the pulse 80. The patient was able to respond rationally. The bandages were removed from the lower extremities and the blood pressure at once dropped 10 mm. A reapplication of the bandages raised the blood pressure to 112. At midnight the patient dropped into a normal sleep.

Delivery occurred at 8:50 A.M. the following morning. Directly after the delivery the blood pressure was 150.

b. *Eclampsia*.—We feel that in toxemia of pregnancy and especially in eclampsia where there is a high blood pressure, the medullary centers are overstimulated by the circulating toxins. A similar condition exists in chronic nephritis, and there is no question in our minds that a rapid emptying of the uterus is dangerous if the patient has a blood pressure of 200 or over. The shock is of the primary type, that is, it appears at once and death follows, usually within the hour.

A study of the mortality rates for eclampsia with operative procedure and early delivery,—the treatment formerly in favor,—resulted in very high mortality rates, 50 per cent for accouchement forcé and 23.8 per cent for cesarean section. (Eden's figures.⁹) With the adoption of the Stroganoff technic and nonoperative interference, there was one maternal death in the last sixteen cases at Bellevue Hospital.

We believe that the differences in the mortality rates are explained by the fact that these cases have severe acidosis, as low as 12, 16, 20, or 21 per cent CO₂ combining power (selected cases from Killian and Sherwin¹⁰), and overstimulated vasomotor centers.

There have been no cases of shock in eclampsia in the past two years on the Bellevue service, so we must refer to our former paper on this subject.

Primary Shock, Eclampsia

CASE 13.—Bellevue Hospital. A. R. Age twenty-five. Para i. April 25, 1910. This patient had a history of having had one convulsion. At 3:25 P.M. shortly after admission, another convulsion occurred and the blood pressure taken at this time was 210. She was placed on the table and prepared for delivery. The cervix was fully dilated and a breech was presenting, with the membranes ruptured. At 3:45 P.M. a child was delivered by breech extraction and another head engaged at once. A half hour later a second child was delivered after an easy forceps operation. The placenta was expressed by the Credé method after twenty minutes. There was only the ordinary amount of blood lost and the cervix was not lacerated. There was a medium tear of the perineum which was sutured at once. The anesthetic was ether and only a small amount was given. Both children lived.

At 4:35 P.M. the blood pressure was 108, pulse 128. Hot saline irrigation was given by rectum, and the patient returned to bed. At 5:30 P.M. the blood pressure

was 120, and at 10 P.M. it had reached 185, pulse 112. At 4 A.M. the blood pressure was 200 and four convulsions occurred in rapid succession.

The patient made a good recovery.

We have a number of cases of eclampsia, in which the delivery was either spontaneous or operative, which showed a drop in the systolic blood pressure of 90 to 100 mm. of mercury following the delivery, but to control our findings of so long ago we present a similar case from the paper of O. H. Schwarz.¹¹ This patient was an eclamptic. On May 13, 1923, labor was induced by a Voorhees bag. Delivery was by a low forceps procedure. At 10:30 A.M. the patient's blood pressure was 195. She was delivered at 12 noon, and at 1:30 P.M. the blood pressure was 93. At 4:30 it fell to 80, a drop of 115 mm. in six hours, and then there

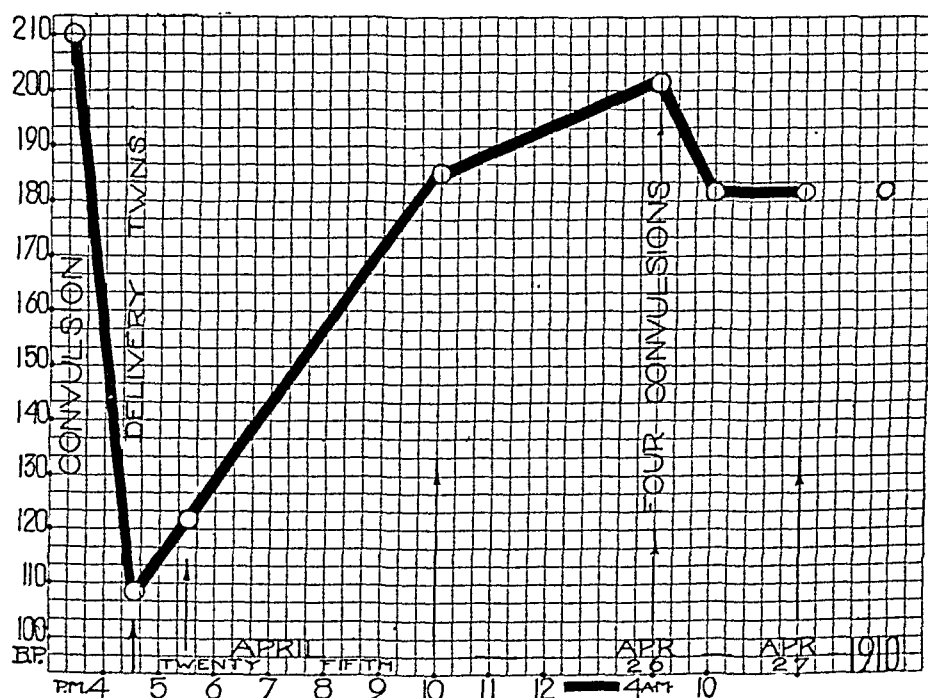


Chart VII.—Case 13. Primary shock. Eclampsia.
(From paper on Shock in Eclampsia, 1911.)

was a gradual rise until the reading the next morning, which was 120. Recovery followed.

c. *Chronic Nephritis*.—It seems best to us to induce labor in patients having a high blood pressure and chronic nephritis in order to prevent further damage to their kidneys. When premature separation of the placenta is associated with chronic nephritis it becomes necessary to end the pregnancy. We will report one case where delivery was followed by shock and present a chart with description of a similar case from Dr. Schwarz's report.

Primary Shock, Chronic Nephritis

CASE 14.—Bellevue Hospital. D. A. Age thirty-two. Para vi. May 11, 1923. Premature separation of the placenta. On admission the patient's blood pressure was 220/140 and there was three-plus albumin in the urine. About 500 c.c. of

blood was lost before labor was induced. Induction was started by the insertion of a bougie and later a bag.

The duration of the labor was forty-eight hours. The blood pressure at the end of this time was 260/140. Three hours after the bag was expelled, the patient was placed on the table and the child delivered by version. The version was easily performed but the extraction was difficult because of the raised arms. The placenta came away spontaneously and the normal amount of blood (500 c.c.), was lost.

After the delivery the pulse was very weak and there was marked pallor as well as sweating. Almost at once the patient became pulseless. She was given

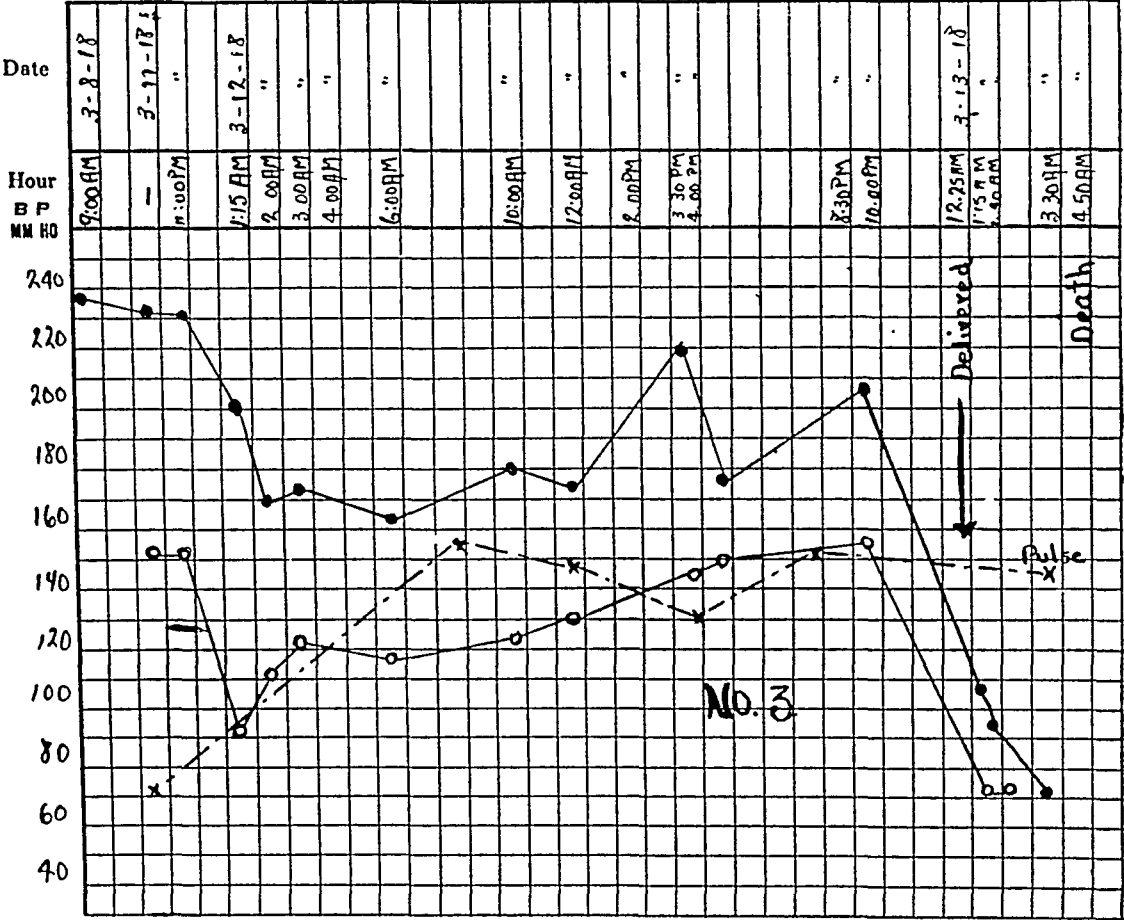


Chart VIII.—Nephritic toxemia. Spontaneous labor, nonoperative delivery. Death from shock. (From paper by O. H. Schwarz.)

an adrenalin series, hypodermoclysis of saline, external heat and intravenous saline infusion. There was no improvement and death followed promptly.

Dr. O. H. Schwarz¹² records in Case 3 of his paper, the history of a patient with chronic nephritis. On March 18, 1918, after a twenty-six-hour labor she delivered spontaneously. Ether anesthesia was used. The day before the delivery her blood pressure was 230 and during labor it went as high as 220. At 3:30 P.M. it was 220. Delivery occurred nine hours later and it was found that the blood pressure was 108, a drop of 100 mm. In the course of the next two hours it dropped to 70 and death followed at 4:30 A.M., four hours after the delivery.

In the eclamptic and nephritic types of shock, we believe that sudden

death is due to splanchnic dilatation following the lowering of the intra-abdominal pressure that occurs with the delivery of the child. The large mass of the uterus sinks into the pelvis and there must be a vacuum drag toward the abdomen. It is probable that the vasomotor center, already interfered with, is not able to accept the further load and loses control, although even then it is not entirely paralyzed as we can show recovery in many of these cases.

TREATMENT

Formerly in the treatment of shock cases we employed only the ordinary measures of position, heat, morphine, water by rectum, saline under the breasts and intravenous infusion of saline. In 1924 we added blood transfusion, but even with special effort it was impossible to transfuse the emergency cases because of the difficulty of procuring donors within several hours. We then established our own group of donors, but we were still unable to give a transfusion within three or four hours; therefore, we adopted gum glucose injections as a substitute for immediate transfusion or actually, in our procedure, as a substitute for intravenous saline infusion.

In 1921, Dr. Lilian K. P. Farrar¹³ reported the successful use of gum glucose as a prophylactic measure against acidosis and her report was later supplemented by a summary by Ainsworth Smith,¹⁴ of the shock cases so treated at the Woman's Hospital. There were eighteen patients with postoperative shock who recovered following gum glucose injections, and there were nine others who died; however, their condition was so serious that entirely aside from the shock their recovery was hardly to be expected.

In 1918, William M. Bayliss¹⁵ discovered that gum glucose solution and saline were of great value in the treatment of shock, especially when transfusion was impossible. Gasser, Herbert and Erlanger¹⁶ used hypertonic solution of 25 per cent gum acacia and 18 per cent glucose and in 1919 reported their results in twelve cases. Their theory was to make the solution hypertonic so that it would draw a great deal of water to the blood stream. However, this solution was so concentrated and the fluid was so slowly attracted to the blood stream that its use was discontinued.

Dr. Farrar used the 6 per cent gum but combined it with 20 per cent glucose. The crystalloid glucose attracted the water from the tissues and the gum maintained the pressure in the vessels through its osmotic and colloidal action. She has seen no deleterious effects from the injection which she has used since 1920. Our first injection of the solution was with material borrowed from her, and we have adopted the apparatus in use at the Woman's Hospital.

We believe that, in all cases of shock with hemorrhage, the injection of gum glucose should be followed within an hour or two by the trans-

fusion of blood for the effect of the gum glucose is lost after four or five hours. It so happens that our admissions of shock cases in 1925 were numerous, and the satisfactory experience that we had with the administration of gum glucose in nine shock cases leads us to consider it of great value.

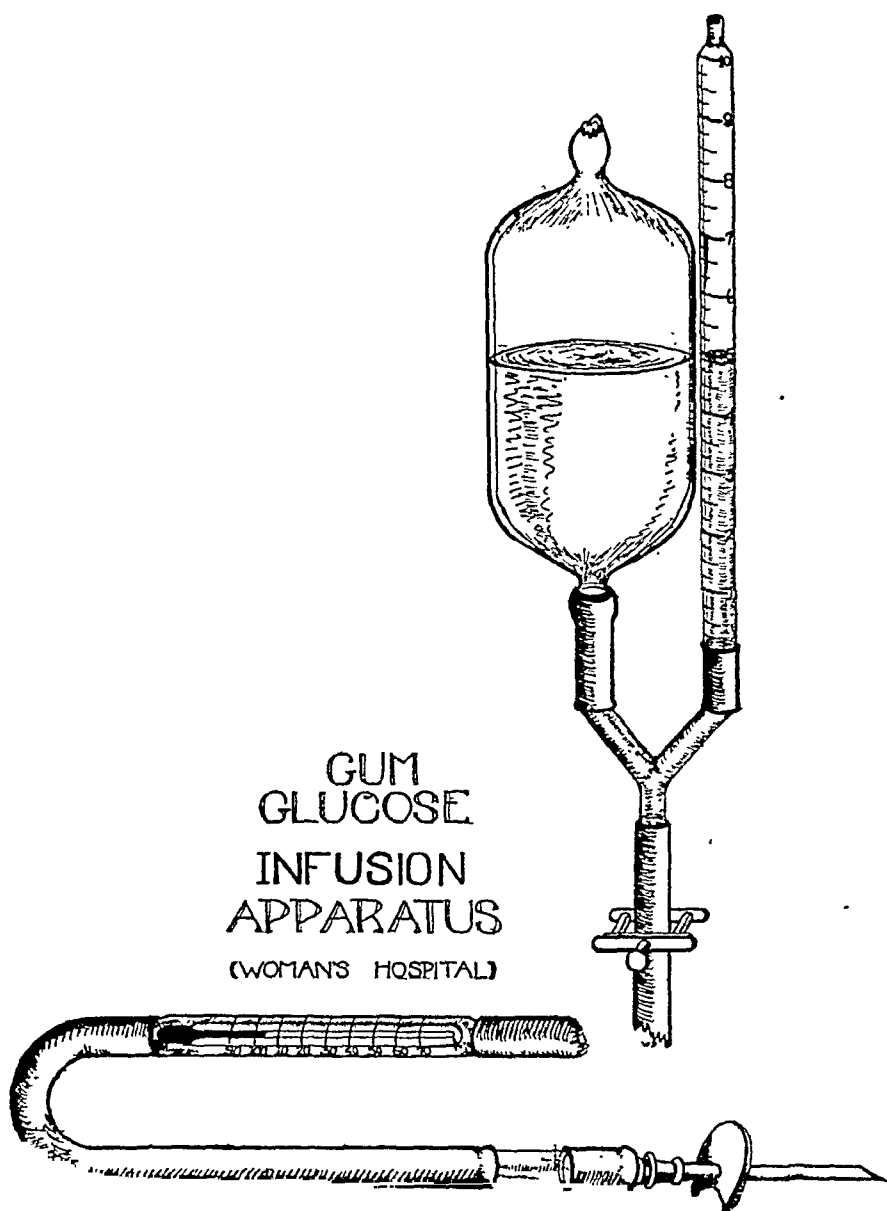


Fig. 1.—Gum glucose infusion apparatus.
(Devised by Dr. Farrar of the Woman's Hospital.)

No one can deny the effectiveness of accessory treatment, such as morphine and heat and lowering the head of the patient. In obstetric conditions further venous hemorrhage from the uterus is nearly impossible when the foot of the table is raised. We also consider of real value in exsanguinated patients the injection of warm tap water into the rectum. The water should be given in six ounce injections, if the patient is in an elevated position or, if she is in bed, the Murphy or

Harris drip should be used. Hypodermoclysis of saline, 500 c.c. under either breast, is also of value, as is intravenous infusion of saline, but we do not give the latter unless forced to do so by lack of other material. We are sure that in the past, saline infusion has saved many of our patients, but the resulting rise in blood pressure is very temporary. The infusion of gum glucose, as we have stated, holds the blood pressure rise for several hours. Apparently 300 c.c. is a sufficiently large injection, but there is no reason why it should not be repeated. The solution should be 104° and it must not be injected more rapidly than 4 c.c. per minute. If the blood pressure is 80 or above, the patient is probably not in extreme shock and rather than inject gum glucose she should be treated by the other methods described above.

In order to determine the condition of the patient as regards acidosis at the time of operation the CO₂ combining power should, if possible, be obtained and the blood pressure taken before operative procedure is started.

CONCLUSIONS

In our opinion shock should be treated in the following manner: In patients exhibiting preliminary symptoms of shock and exhaustion, no operative procedure should be considered until the blood pressure is 100 or above, and the operation should be conducted under gas and oxygen anesthesia, three parts to one as suggested by Cannon. One should be prepared to encounter shock in the delivery of cases of accidental hemorrhage, placenta previa, long and difficult labor, eclampsia and chronic nephritis. Frequently more than one of the etiologic factors may be present. After acute hemorrhage a mechanical packer should be immediately inserted into the uterus and the uterine cavity packed with iodoform gauze. Usually it is well to pack the vagina also as it then acts with some resistance in the event of contractions. This is a prophylactic measure to prevent the further loss of blood.

In the presence of actual shock the patient should be placed with the head and shoulders lower than the rest of the body and given warm tap water by rectum, six ounces at a time. One thousand c.c. of normal saline solution should be injected by hypodermoclysis beneath the breasts. If the shock is complete and the blood pressure is 80 or below, 300 c.c. of gum-glucose should be injected slowly, at the rate of 3 or 4 c.c. per minute. A universal donor should be brought to the hospital and if the blood loss has been excessive the patient should be transfused.

In nine cases in which we found it necessary to give gum glucose for shock there was a response in every case. One patient died within an hour from secondary hemorrhage and one died on the second day but in the interval her systolic blood pressure ranged from 98 to 112.

REFERENCES

- ¹Cannon, Walter B.: Traumatic Shock.
- ²Ibid., p. 54.
- ³Ibid., p. 54.
- ⁴Williamson, A. C.: AM. JOUR. OBST. AND GYNEC., 1923, vi, 263.
- ⁵Cannon, Walter B.: Ibid.
- ⁶Henderson, Yandell: AM. JOUR. PHYSIOL., April 1, 1909, xxiv, No. 1.
- ⁷Williamson, A. C.: AM. JOUR. OBST. AND GYNEC., 1923, vi.
- ⁸Bailey, Harold: AM. JOUR. OBST., 1911, lxiv, No. 2.
- ⁹Eden, T. W.: JOUR. OBST. AND GYNEC. BRIT. EMP., 1922, xxix, 456.
- ¹⁰Killian, J. A., and Sherwin, C. P.: AM. JOUR. OBST. AND GYNEC., 1921, ii, 6.
- ¹¹Schwarz, O. H.: AM. JOUR. OBST. AND GYNEC., 1923, vi, 656.
- ¹²Ibid.
- ¹³Farrar, Lilian K. P.: Surg., Gynec. and Obst., April, 1921, p. 328-339.
- ¹⁴Smith, Ainsworth: Report of the Scientific Work of the Surgical Staff of the Woman's Hospital in the State of New York, 1921-1922, iv.
- ¹⁵Bayliss, William M.: JOUR. PHYSIOL., March 25, 1916.
- ¹⁶Gasser, Herbert, and Erlanger: Ann. of Surg., 1919, lxix, 389.

LIPOMA OF THE BROAD LIGAMENT, WITH THE REPORT OF A CASE*

BY REGINALD M. RAWLS, M.D., F.A.C.S., NEW YORK, N. Y.

(*Attending Surgeon, Woman's Hospital*)

RETROPERITONEAL lipoma is an unusual pathologic finding, but lipoma of the broad ligament is even more unusual. In 1923, Greensfelder and Bettman¹ reported a case of retroperitoneal lipoma and reviewed the literature and found recorded 181 or more cases. They quote Wahlendorf² who collected 165 cases and found it occurred more often in the female, 72 per cent as compared to 28 per cent in the male, and was situated in the abdominal cavity in 79 per cent and in the pelvic cavity in 21 per cent; of 132 proved cases 6 per cent were in the lesser pelvic cavity. In 1921, Masson and Horgan³ reported but twelve cases of the retroperitoneal lipoma from the Mayo clinic and none of these were of the lesser pelvic cavity. In 1919, Lockyer⁴ reported a case of lipoma of the broad ligament and was able to find but seven true cases in the literature. He states that examples of true lipoma of the broad ligament are rare. The scanty supply of fat in this retroperitoneal situation affords an easy explanation of this fact.

I have been able to add, from the literature, but two cases as follows: Klein,⁵ in 1909, reported the removal by operation of a lipoma, size of a small fist, from the left broad ligament of a nullipara forty years of age. Pollock,⁶ in 1852, reported 256 pathologic conditions of the uterus found in 583 autopsies and among these was one case with a simple fatty tumor in the tissues of the broad ligament.

Lockyer has no opinion to express as to the etiology of these broad

*Read at a meeting of the New York Obstetrical Society, October 13, 1925.

ligament tumors and feels that the speculations of other writers are not very helpful. Borrmann⁷ suggests that local developmental anomalies may have a causal relationship. Doran⁸ hints at "some teratological element" being concerned. Adami⁹ notes that retroperitoneal lipoma are more common in women than in men and that the right side is a commoner site than the left. According to this author the most frequent situations for retroperitoneal lipomata are the region of the kidney and the iliac fossa. Quoting Greensfelder and Bettmann:¹ "The tumor usually arises from the paranephritic fat, but it may arise from the renal capsule, the mesentery, the pararectal and retrorectal fat, as well as from other retroperitoneal sites. It occurs about equally on either side of the abdomen."

The ten true lipomata of the broad ligament, reported in the literature, varied in size from a few centimeters to a very large tumor reported by Middelschulte¹⁰ which weighed thirty-three pounds and measured 88 cm. by 90 cm. The age of the women when these tumors were removed was from thirty-one to sixty-four years. The clinical diagnosis was difficult as is characteristic of all retroperitoneal lipomata because of the lack of discomfort even with large tumors until pressure symptoms are present and then the usual diagnosis is a cyst.

Doran,¹¹ quoted by Lockyer, "draws a sharp distinction, from a surgical point of view, between prevertebral lipomas and those of the broad ligament and the omentum. The former are often very adherent and many of them are sarcomatous, they yield a very heavy mortality where operation is attempted; whereas lipomata of the broad ligament and the omentum are benign, nonadherent, therefore easily removed, and the prognosis is good."

The report of my case, which follows, conforms in practically all respects with the ten cases reported in the literature:

E. G., a negress, thirty-seven years of age, married nine years but never pregnant, was admitted to the Woman's Hospital, November 14, 1922. For the past three months she had noted a gradual enlargement of the abdomen associated with pain and swelling of the left foot and leg. Otherwise her history was negative except for frequent urination during the day and three times during night at which time the amounts were markedly increased. Her maximum and present weight was 117 pounds and she had suffered no loss of strength.

Physical examination was negative except for an abdominal tumor which extended from the left pelvic cavity to four finger breadths above the umbilicus with its lateral border slightly to the right of the midline. The cervix was on a level with the symphysis and the fundus of the uterus was enlarged, irregular, and pushed upward and to the right and there was a hard mass in the right cornua. All laboratory tests were negative except a trace of albumin and pus cells in the urine. The patient was seen in consultation with four other members of the staff and the consensus of opinion was multiple fibromyoma and ovarian cyst.

During the first four days in the hospital, there was an afternoon elevation of temperature, and occasional bloody expectoration and at times marked intesti-

tinal distention which on one occasion had to be relieved by a milk and molasses enema. Therefore it was thought that the condition might be a tubercular peritonitis.

Under ether anesthesia the abdomen was opened by a left rectus incision extending from just above the symphysis to four finger breadths above the umbilicus. (Fig. 1.) There was no free fluid nor adhesions in the pelvic or abdominal cavities. A large tumor arose from the left pelvis which in its growth had carried the left round ligament and the bladder reflection up into the abdomen. The tumor

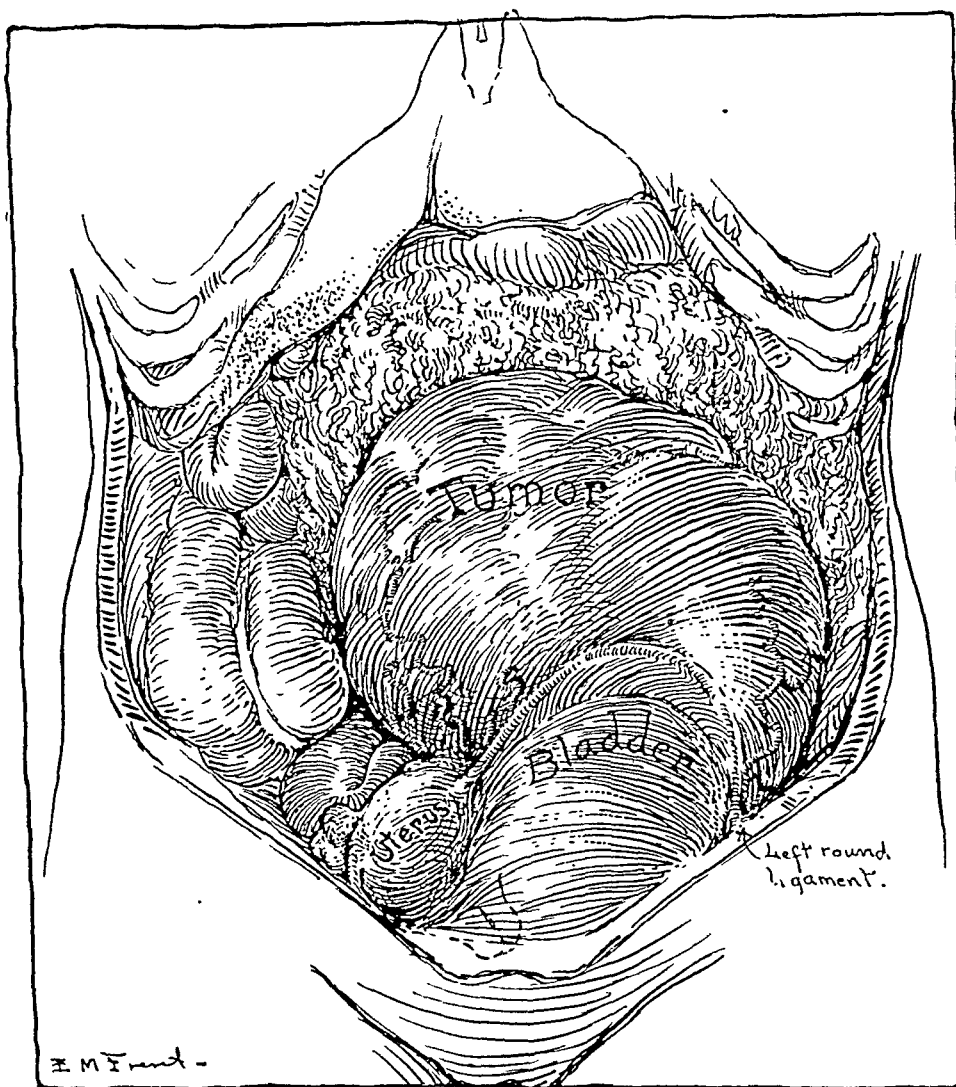


Fig. 1.—Lipoma of broad ligament. Anterior view of tumor in situ.

mass was anterior to the omentum, the sigmoid, and rectum, and its anterior and posterior surfaces were covered by peritoneum with a number of medium branching blood vessels on its lateral surfaces. The peritoneum on the posterior part of the tumor extended for only a short distance as compared to the anterior surface but when an attempt was made to separate it the mesentery was entered and I realized for the first time I was dealing with an intraligamentous tumor rather than an adherent ovarian cyst. (Fig. 2.) As a hysterectomy was indicated, the easiest way to approach the tumor was by freeing the bladder reflection from its position on the lower third of the mass and by cutting the left round ligament at its uterine end. When this was

done the lipomatous tissue was exposed and the tumor easily shelled out from the folds of the broad ligament except at its lower pole, where it was intimately associated with the deep pelvic and femoral vessels from which the tumor received its blood supply. While the lipoma was in close contact with the femoral ring, no part of the tumor extended through this ring to the thigh. The left ureter was dilated to twice its normal size and was displaced by the tumor forward and to the right of the median line.

The patient made an uneventful recovery. We have not recently had the opportunity of examining her but I am in receipt of a letter in which she says "I am fine. Never had better health."

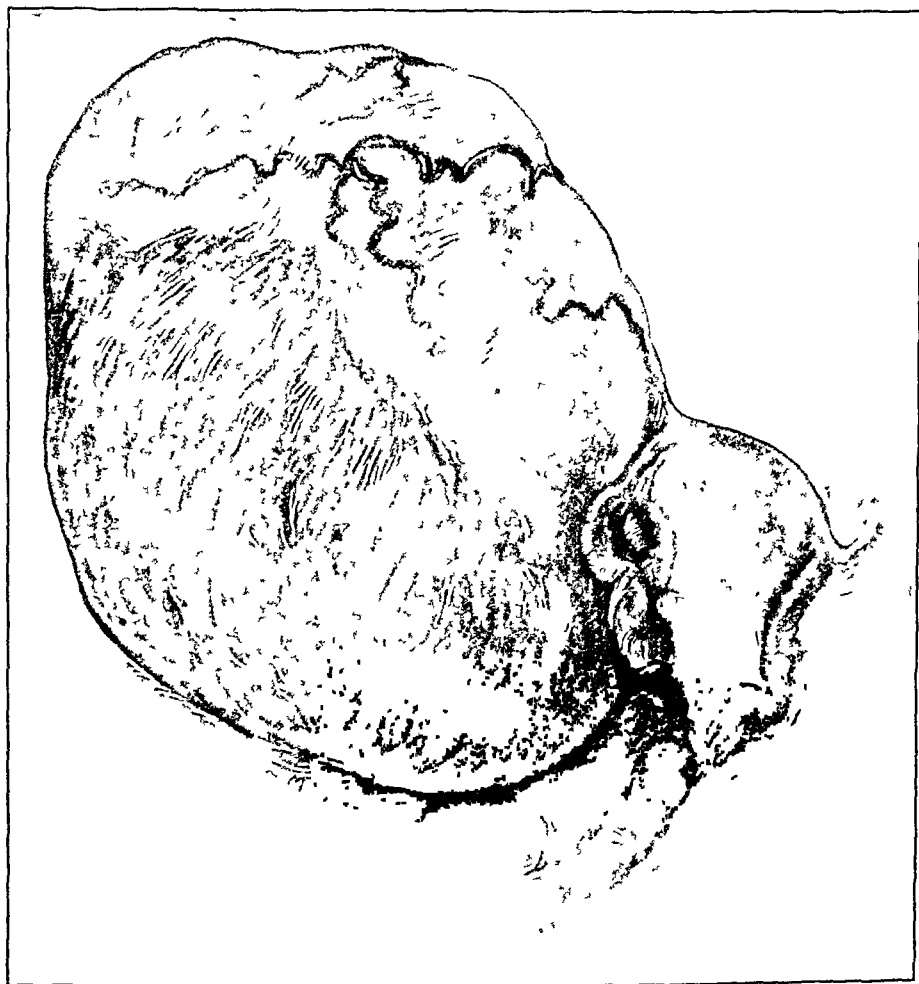


Fig. 2.—Lipoma of broad ligament. Posterior view of tumor in situ after partial enucleation.

The pathologic report by Dr. Larrimore, in part, was as follows:

Diagnosis.—Lipoma of broad ligament, myoma uteri, chronic pseudocystic salpingitis, and fibrocystic ovary.

Macroscopic Findings.—The tumor was a very large, more or less lobulated lipoma about 20 cm. in diameter, partially covered by reflected peritoneum. The structure was that of a uniform dense fatty tissue throughout, interspaced by small strands of connective tissue carrying few blood vessels. The round ligament was stretched underneath the tumor.

Microscopic Findings.—Frozen section showed the tumor to be a lipoma, with large fat cells surrounded by thin interlobular connective tissue septa. This becomes a thick fibrous capsule in places.

I wish to express my appreciation to Dr. Morris Dreyfuss, Assistant Pathologist to the Woman's Hospital, for his interest in this case report and his help in searching the literature for other cases of lipoma of the broad ligament.

REFERENCES

- ¹Greensfelder, L. A., and Bettman, R. B.: Surg., Gynec. and Obst., 1923, xxxvii, 468.
- ²Wahlendorf, A. L. von: Arch. f. klin. Chir., May, 1921, cxv, 751.
- ³Masson, J. C., and Horgan, E. J.: Surg. Clin. N. Am., 1921, i, 1451.
- ⁴Lockyer, Cuthbert: Proc. Roy. Soc. Med., 1918, 1919, Sec. Gynec., and Obst., 195.
- ⁵Klein, Abstract, Monatschr. f. Geburtsh. u. Gynäk., 1909, xxix, 789.
- ⁶Pollock: Half Yearly Abstracts of the Med. Sc. 1852, xvi, 357.
- ⁷Borrmann: Virchow's Arch. f. path. Anat. u. Phys., 1907, clxxxix, 431.
- ⁸Doran, A.: Trans. Path. Soc. London, 1890, xli, 202.
- ⁹Adami, A.: Montreal Med. Jour., Jan., Feb., 1897.
- ¹⁰Middelschulte, F.: Anaual Dissertation, Greifswald, 1884.
- ¹¹Doran, A.: Jour. Obst. and Gynec. of British Empire, 1902, ii, 244.

350 WEST EIGHTY-EIGHTH STREET.

(For discussion see page 410.)

THE USE OF THE VAGINAL STETHOSCOPE IN THE EARLY DIAGNOSIS OF PREGNANCY*

BY F. H. FALLS, M.D., IOWA CITY, IOWA

(From the Department of Obstetrics, State University of Iowa)

THE early diagnosis of pregnancy has received considerable attention from obstetricians and associated scientists in recent years. About a decade ago Abderhalden's¹ serodiagnosis was considered specific for a time but soon fell into disrepute even among its enthusiastic early sponsors.

Reuben Peterson² has advanced the roentgen ray in conjunction with pneumoperitoneum as the best evidence in early pregnancy. He depends on a characteristic change in the uterine shadow seen as early as the second and third month. Stein³ has shown that with pneumoperitoneum the fetal skeleton can be seen on the x-ray photograph as early as the fourth month. The sugar tolerance test has been brought forward by Milnor and Fennel,⁴ who have shown that the sugar tolerance is markedly decreased in the early months of pregnancy.

There are inherent weaknesses in all of these methods. The Abderhalden test was found to react positively in conditions others than pregnancy. Falls⁵ and others have shown that the blood ferments were increased during pregnancy as Abderhalden claimed, but were non-specific. The advisability of subjecting the pregnant woman to the discomfort if not the danger of the transabdominal pneumoperitoneum and the expense incident to the operation and Roentgen ray pictures,

*Demonstrated before the Johnson County Medical Society on December 12, 1923.
Received for publication, November 9, 1925.

limit its general use. The changes in the sugar tolerance are too frequently seen in other conditions than pregnancy to make its significance more than a presumptive sign of pregnancy.

It is therefore necessary to wait the positive signs of pregnancy as the criterion in a doubtful case. These positive signs, however, do not become available ordinarily until the eighteenth or twentieth week. Probably the best of the positive signs of pregnancy are the fetal heart tones. Sarwey⁶ has reported hearing these as early as the fourteenth week after prolonged auscultation through the abdominal wall in a very quiet room, although they are rarely heard before the twentieth week under ordinary circumstances, and oftentimes not until several weeks later in the presence of an unusually fat abdominal wall, hydramnios, or ascites.

It would seem desirable if some method could be devised to promote the hearing of the fetal heart tones before the eighteenth week, and at

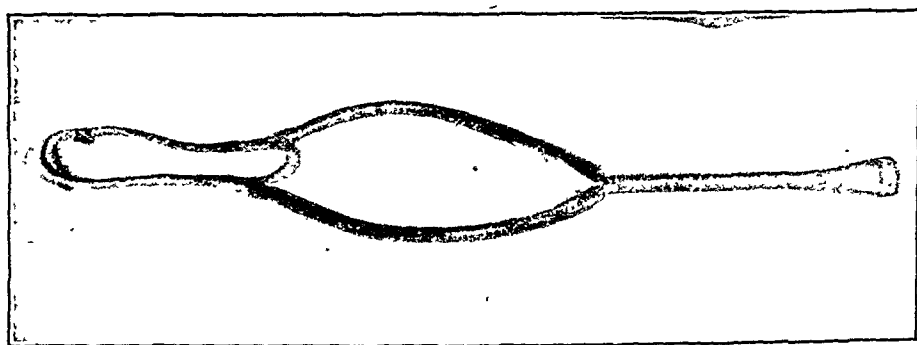


Fig. 1.—Vaginal stethoscope with ordinary stethoscope earpieces attached.

the same time to obviate the difficulties encountered when the above-mentioned conditions were present.

With this idea in mind we devised a stethoscope that could be applied over the lower uterine segment through the vagina. This was accomplished by making a long-handled stethoscope, the bell of which could be introduced into the vagina and the earpieces attached to the rubber tubes of an ordinary Shepherd stethoscope.

By using this instrument we have been able to diagnose pregnancy about the fourteenth to sixteenth week in twenty patients. At first, we found that the heart tones could not be heard except by accident when the stethoscope was first applied to the lower uterine segment. The instrument had to be adjusted to the various parts of the wall and often the auscultation had to be continued from ten to fifteen minutes. The probable reason for this is that the fetus at this stage of pregnancy is relatively small compared with the size of the amniotic cavity, and so freely movable that one had to wait until it floated over the lower uterine segment in such a way that the back approximated the uterine wall before the heart tones could be appreciated. Therefore, in order to facilitate this position of the fetus *in utero*, we placed

the patient in the Fowler position when the tones became audible in practically all cases.

When these conditions are fulfilled the heart tones come through strong and true and there is absolutely no question as to their identity in the mind of the observer. In addition one can often hear the dull thud of the fetal movements, which are characteristic of pregnancy even when the fetal heart tones cannot be heard.

Another use to which the vaginal stethoscope may be put is the auscultation of the lower uterine segment in patients with placenta previa. At or near term there is audible a uterine souffle on both sides of the midline in the lateral fornices in normal cases. However, this normal uterine souffle was decidedly increased in two patients with low implanted placenta in whom we could observe it even in the early months. Further study of this point is in progress.



Fig. 2.—Counting fetal heart tones by means of vaginal stethoscope. The patient is in the semi-Fowler position.

The vaginal stethoscope is of practically no value for hearing heart tones after the twentieth week. The reason for this is that the uterus has risen so high into the abdomen at this stage of development and the fetus is so large that the distance of the heart from the lower uterine segment is too great whether a head or a breech presentation is present. Theoretically this instrument would be of value in confirming the diagnosis of a transverse presentation especially in a very stout abdomen if the tones were well heard vaginally at or near term. We have not as yet had an opportunity to study such a case.

Some idea of the physical difficulties involved in this study can be obtained from a consideration of the accompanying photograph of four fetal hearts removed from fetuses of varying maturity. The measurements of the hearts and the description of the size of the fetus is shown in Table I. Heart tones created and transmitted from Specimen I

(Fig. 3) are easily audible through the abdominal wall by using the ordinary stethoscope or even by the naked ear applied over the abdomen. This is a heart removed from a seven months' fetus. The next, Specimen II, is the heart of a four and one-half months' fetus and it is about this stage of the development of the fetus that we begin to expect to hear heart tones on auscultation in the usual way through the abdomen. Specimen III is from a fetus about sixteen weeks' development and tones from such a heart are usually not audible abdominally but can be heard well vaginally with this instrument. Specimen

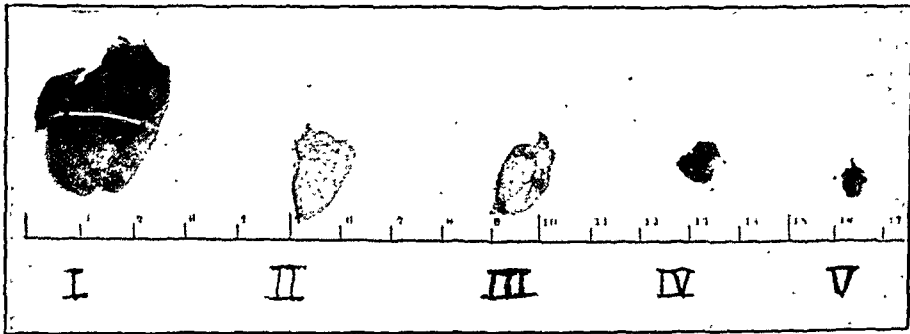


Fig. 3.—Fetal hearts from fetuses varying from 7 cm. to 17 cm. in length. The scale shows centimeters.

mens IV and V are fetal hearts too small to create sounds capable of being appreciated outside the uterus through any known device.

TABLE I

PERIOD	LENGTH	SIZE OF HEART	WT. OF HEART
9 weeks	7 cm.	5 mm. x 6 mm.	
14 weeks	12.5 cm.	8 mm. x 9 mm.	0.550 grams
4 months	15 cm.	11 mm. x 17 mm.	0.600 grams
4½ months	17 cm.	13 mm. x 18 mm.	0.600 grams
7 months	34 cm.	2 cm. x 3½ cm.	5.100 grams
8 months	40 cm.	2 cm. x 4 cm.	12.000 grams

From a consideration of these factors it may be stated as a physical law that the audibility of the tones of a heart of a certain size producing a tone of a certain pitch and intensity will vary inversely as the distance between that heart and the stethoscope and as the density and thickness of the interposed structures.

The desirability of a positive diagnosis of pregnancy in the early months in certain patients is unquestioned. Among the important conditions to be differentiated are, fibroid uterus with or without pregnancy, hydatid mole, carneous mole, carcinoma of the body of the uterus, sarcoma of the uterine body, ovarian cysts, and ectopic pregnancy with hematocele. Many of these conditions present themselves for diagnosis at the time the pelvic tumor is about the size of a four months' pregnancy. The value of an absolute diagnosis by hearing and counting of the fetal heart tones by the vaginal stethoscope applied over the lower uterine segment is obvious. It will also be of use in affirming

or denying intrauterine fetal death in early pregnancy when the clinical symptoms and signs are equivocal.

CONCLUSIONS

1. The vaginal stethoscope advances the time of hearing and counting the fetal heart tones about four weeks making this sign, therefore, precede quickening.
2. It is of some value in the diagnosis of placenta previa.
3. The instrument is of especial value in patients with a very thick abdominal wall offering difficulties in abdominal auscultation.
4. It is of value in the diagnosis of the death of the fetus in early pregnancy.
5. It is of aid in the diagnosis of mole pregnancy.
6. It is of aid in determining the presence or absence of pregnancy complicating uterine fibroids.
7. Fetal movements as well as the fetal heart tones can be heard vaginally in the early months and are a valuable aid in the confirmation of the diagnosis of early pregnancy.

REFERENCES

- ¹Abderhalden: Deutsch. med. Wchnschr., 1912, No. 46.
- ²Peterson, Reuben: Jour. Am. Med. Assn., Feb. 11, 1922, lxxviii, No. 6, p. 397.
- ³Stein: Jour. Am. Med. Assn., July 7, 1923, lxxxix, 4.
- ⁴Milnor, G. C. and Fennel, E. A.: Jour. Am. Med. Assn., Feb. 16, 1924, lxxxii, No. 7.
- ⁵Falls: Jour. Am. Med. Assn., 1915, lxiv, p. 1898 to 1900.
- ⁶Sarwey: Zentralbl. f. Gynäk., 1904, xxviii, 1156.

DILATATION OF THE CERVIX UTERI BY MEANS OF THE HYDROSTATIC BALLOON

A STATISTICAL REVIEW

BY EMERSON L. STONE, M.D., BALTIMORE, MD.

(From the Obstetrical Department Johns Hopkins Hospital and University)

THE best means of artificially dilating the cervix of the pregnant uterus has never been established on a perfectly satisfactory basis. As a consequence, the operation is performed in many different ways, and the various alternatives have aroused exhaustive discussions. It has been inevitable that such variations of procedure should exist, because (1) the operation is indicated in a variety of pathologic conditions, each one demanding individual study; and (2) interference may be imperative at any period of gestation, when there are commonly great variations in the recognized principles of treatment.

In the induction of abortion, the Champetier de Ribes balloon or the Voorhees bag must compete primarily with curettage, digital or instrumental, preceded or not by a preliminary mechanical dilatation or softening of the cervix by tamponade. Although instrumental curettage of the early pregnant uterus can be vigorously deprecated from the outset because of (a) liability to trauma, (b) destruction of any accumulated cellular resistance against infection, and (c) the uncertainty of completely removing all the tissue; yet digital curettage is satisfactory and safe, and it is often indicated, whatever method of cervical dilatation has been employed. At the same time, it should always be remembered that forcible dilatation of the cervical canal, instrumentally or by the fingers, carries the same risks and disadvantages that it does later in pregnancy.

The pack may spare the cervix from trauma, but it is uncertain in action, particularly in the time element. Moreover, since it promptly becomes saturated with secretions from the surrounding tissues, it acts exactly as a lamp wick in carrying infectious material upward into the uterine cavity. Although the removal of the cervical pack will frequently be followed by the product of conception, yet, so often is secondary interference necessary for the complete emptying of the uterus, that this method of dilating the cervical canal cannot be looked upon as a procedure of choice.

In the occasional instance, when in the presence of a rigid, unyielding cervix, a rapid evacuation of the uterus is indicated, vaginal hysterotomy is clearly indicated; but the disadvantages of a prolonged convalescence and of a permanent scar in the lower uterine segment are not to be regarded lightly.

Simple rupture of the membranes or the application of a bougie must be mentioned, but their status is best considered later, in view of their more frequent employment at or near term.

In the induction of abortion, we have employed the hydrostatic bag with relatively gratifying results, particularly when the pregnancy has progressed beyond the third month. The operative aspect of the case is confined in most instances to one sitting, and often the introduction of the bag can be effected without anesthesia. Once properly placed, dilatation of the canal almost always follows, and usually with reasonable promptness; and, in view of the complete effacement of the cervix, spontaneous completion of the abortion is the rule.

After the period of viability of the fetus has been reached, the indications for artificial dilatation of the cervix broaden perceptibly, and the bag finds favor in several groups of cases:

(a) Induction of labor may be necessary for beginning disproportion, whether referable to pelvic contraction or postmaturity of the child.

(b) Constitutional diseases often warrant the induction of labor, particularly toxemias of the nephritic type, intractable urinary infections, and occasionally eclampsia.

These two groups may be classified in a neutral zone where urgency is not usually essential, and in which it is preferable to make a trial with castor oil and quinine, the Watson method, or the application of a bougie. Whereas these latter methods frequently fail to accomplish the desired result, the bag used as a terminal procedure rarely fails to bring about sufficient dilatation of the cervix to permit prompt termination of the pregnancy.

In contrast to these types of cases, there is the more tragic variety, which urgently demands a relative acceleration of the first stage:

(a) The occasional instance of cervical dystocia or uterine inertia, where the dilatation is excessively, and often unexplainedly, retarded.

(b) The "hemorrhage" group, including all the placenta previa cases, as well as certain degrees of premature separation of the placenta. In these instances the hydrostatic bag finds its greatest usefulness, and in our judgment, is often the only rational procedure.

In regard to the other alternatives:

I. Simple rupture of the membranes is useful in cases of hydramnios, but carries the following objections:

(a) Loss of the physiologic hydrostatic dilator,

(b) The opening of an avenue of infection by the transamniotic route, and

(c) An uncertainty of action.

II. While the bougie, when successful, should be regarded as the most conservative and ideal means of inducing normal labor, it acts

with a striking lack of specificity, and is useful only when the operator can afford to wait or is prepared for failure.

III. The cervical pack and laminaria tent carry the same objections, in addition to their insidious potentialities as regards infection.

IV. Manual dilatation of the cervix—*accouchement forcé*—has practically fallen into disrepute, except in the rare instances in which a soft and almost fully dilated cervix requires only a few turns of the hand to effect its complete effacement. In such circumstances, the rewards of the moment more than compensate for the inevitable trauma and exposure to infection, or when a more temporizing program seems unfair to an exhausted patient.

V. Similarly, Dührssen's multiple incisions, or even vaginal hysterotomy, are doubtless justified in rare instances; while the Braxton-Hicks version may likewise be preferred or even necessitated by the pressure of circumstances.

In brief, we find that the hydrostatic bag is applicable to the greatest number of case types; that it serves well in complications of pregnancy after the fourth month; that it most accurately simulates the physiologic mechanics, and that the maternal and fetal welfare are best insured through its employment.

The bag, however, in common with most of its competitors, possesses the following inherent disadvantages:

(a) Its introduction often forces the presenting part out of the pelvis, and thus converts a potentially spontaneous into an operative labor, frequently necessitating version after the expulsion of the bag.

(b) It tends to cause premature rupture of the membranes, with its associated liabilities.

(c) The patient requires reasonably close supervision, since, when the membranes are already ruptured, the cord is liable to prolapse following the expulsion of the bag.

(d) The risk of leakage from or of a collapse of the bag is a definite handicap.

In order to appraise the true value of the hydrostatic bag, the clinical material of this department has been reviewed from its opening in 1899 up to May 1, 1925. During this period, 14,822 cases have been discharged from the house service, and the bag has been employed 178 times—the incidence being 1.2 per cent, or once in every 83.3 patients.

To obtain ideal statistics it would be necessary to divide the cases into groups, and compare the results in each with those of similar cases treated under the same conditions by other means. This, however, would render the case groups so small that conclusions would hardly be justified.

Employing the arbitrary limits of 2500 grams and above for ma-

turity, 1500 to 2500 grams for prematurity, and below 1500 grams for abortion, the cases may be grouped as follows:

Term	92
Premature	50
Abortion	36
	<hr/> 178

This confirms, in brief, our generalization that the bag is applicable to problems arising in all periods of pregnancy, except in the first three months.

The indications for the operation fall into four distinct groups: (a) Pathologic aspects of the mechanics of labor; (b) Hemorrhage; (c) Toxemias, and (d) Simple inductions. Whereas several cases present multiple problems, the outstanding one is selected for comparative figures, and secondary considerations are included separately, as follows:

(a)	Cervical dystocia	21	
	Uterine inertia	16	
	Transverse presentation	4	
	Missed labor	2	
	Ruptured uterus	1	
			44
(b)	Premature separation of placenta	15	
	Placenta previa centralis	8	
	Placenta previa partialis	21	
	Placenta previa marginalis	31	
			75
(c)	Preeclamptic toxemia	9	
	Eclampsia	9	
	Nephritic toxemia	19	
			37
(d)	Induction of labor	15	
	Induction of abortion	7	
			22
			<hr/> 178

Added factors affecting the decision to treat patients in this manner are as follows:

Premature rupture of the membranes	34
Failure of bougie	26
Intrapartum infection	25
Prolonged labor	19
Prolapsed cord	8
Failure of oil and quinine	6
Failure of "pituitary" induction	5
Cardiac disease	4
Shock	2
Chorea, contraction ring, diabetes, hy-	
dramnios, pyelitis—each	1

In this series, considerations of the bony pelvis are of relatively slight importance in indicating the use of the bag; for we reject on principle the induction of premature labor on account of contracted pelvis. It might be added that, in this series, the incidence of pelvic

contraction, contrasted with correspondingly low incidence of pelvic dystocia, serves to show that it should be regarded merely as an accidental complication.

TABLE I

TYPE OF PELVIS	OCCURRENCE	DYSTOCIA
Generally contracted typical	9	0
Generally contracted rachitic	12	7
Generally contracted funnel	2	0
Generally contracted rach. funnel	1	0
Flat, simple	8	3
Flat, rachitic	1	0
Funnel, simple	16	1
	49	11

Table I shows that, while 27.5 per cent of the 178 patients presented contracted pelves, yet only in 6.2 per cent were signs of pelvic dystocia apparent.

Analyses of the clinical course in each instance of dilatation with the bag are here appended. For greater clarity of interpretation the cases are divided into (a) Term, (b) Premature, and (c) Abortion.

	TERM (92)	PREMATURE (50)	ABORTION (36)
I. 1. Average time of expulsion	7 h. 38 m.	6 h. 18 m.	8 h. 49 m.
2. Spontaneous delivery	32	25	22
3. Version	29	15	9
4. Braxton-Hicks version	3	3	1
II. 5. Bag failures	13	5	8
6. Manual dilatation (following failure of bag)	9	3	6
III. 7. Forceps	10	2	0
8. Breech extraction	14	4	1
9. Craniotomy	9	2	0
10. Cervical repair	5	1	0
11. Manual removal of placenta	5	1	7
12. Tamponade of uterus	8	0	0
IV. 13. Prolapsed cord	11	0	0
14. Contraction ring	0	1	0
15. Third degree laceration	3	0	0
16. Vaginal hysterotomy	0	0	1
17. Subsequent hysterectomy	0	1	1

The accompanying chart shows the percentage frequency of the more important features, and the figures warrant the following comments:

(a) The likelihood of spontaneous delivery following the expulsion of the bag, varies inversely with the size and development of the fetus.

(b) Version is the operation most frequently employed to effect final delivery, and its incidence is practically the same at all periods of pregnancy.

(c) Manual dilatation of the cervix, as an adjunct, is most frequently necessitated in early pregnancy, doubtless due to the relative insufficiency of the uterine musculature in expelling the bag.

(d) The incidence of minor operative interference is not appreciably increased.

(e) The small number of primary cervical repairs suggests that the maternal soft tissues are not unduly traumatized by the procedure.

(f) The average time of expulsion is within limits of reasonable promptness on the one hand, and of conservative expectancy on the other, as compared with the results of accouchement forcé.

A consideration of the effect upon the cervix is next presented, and although the factor of multiparity and previous local trauma confuses the picture, it appears, at least, that the conditions compare favorably with those found subsequent to spontaneous delivery.

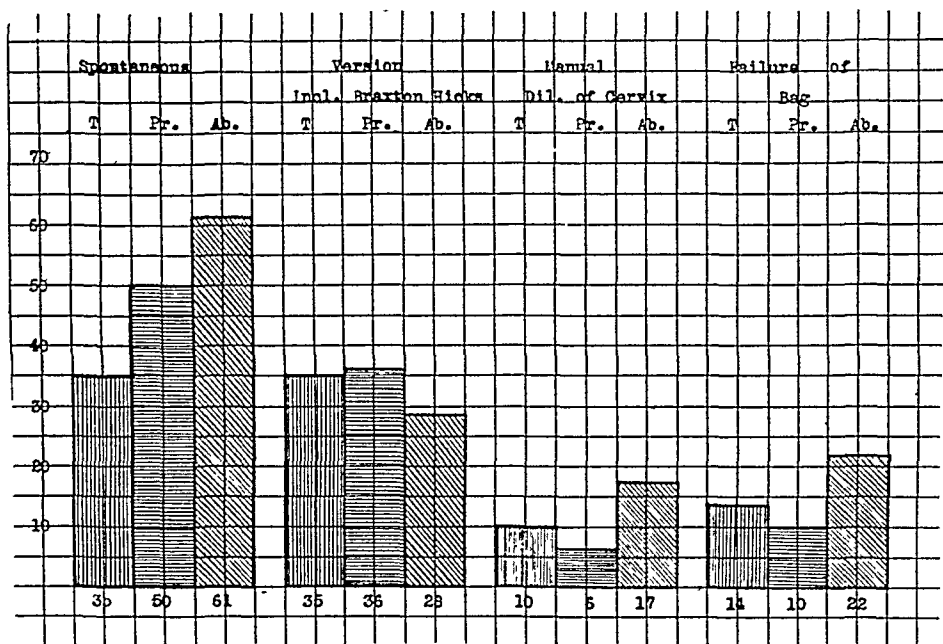


Chart I.

No tear	28
Slight bilateral	29
Slight stellate	31
Moderate bilateral	18
Moderate stellate	21
Deep bilateral	17
Deep stellate	4
Not recorded	30
	<u>178</u>

The puerperium in our patients shows the following morbidity figures:

PUERPERAL INFECTION			
Culture not taken	17	Phlebitis	1
Saprophytes	11	Septicemia	1
Mixed culture	7	Pyelitis	3
Streptococcus	4	Mastitis	1
Culture negative	4	Pneumonia	1
B. coli	3	Bronchitis	1
Gonococcus	2	Measles	1
Peritonitis	3	Operative reaction	2
			<hr/> 62

In other words, a

Gross morbidity of	34.8%
Maternal deaths attributable to infection	3
Maternal mortality (infection)	1.7%

The total maternal mortality for the series is 10, or 5.62 per cent, with the causes of death distributed as follows:

1. Hemorrhage	3
2. Infection	3
3. Shock	2
4. Toxemia	2
	<hr/> 10

Of these cases, five were admitted in extremis from outside sources, so that the corrected mortality, which we consider fairly attributable to the treatment, rather than to the underlying pathology, is 5, or 2.81 per cent. When it is recalled that the gross maternal mortality for all types of cases runs about 0.8 per cent per annum, and that the cases under discussion often represent the most serious surgical risks, we are inclined to look upon this figure as reasonably small. Brief summaries of the fatal cases are appended:

NOTE: Cases eliminated in corrected mortality are Nos. IV, VI, VII, VIII, and X.

I. Para vi. Nephritic toxemia without convulsions. Premature rupture of membranes. Eight cm. bag. Bag ruptured after three hours. Transverse presentation. Manual dilatation of cervix. Version. Postpartum hemorrhage 1200 c.c. Uterine atony. Child alive, normal. Weight 2030 grams. Patient died of shock. (12058)

II. Para v. Nephritic toxemia without convulsions. Attempted induction of labor by 8 cm. bag. Ineffectual. Secondary development of premature separation of the placenta, with concealed and external hemorrhage. Cesarean section with hysterectomy. Died first day (hemorrhage). Child, stillborn. Weight 1470 grams. (11626)

III. Para iii. Intrapartum infection. Premature rupture of membranes, twenty hours standing. Ten cm. bag, expelled in seven hours. Spontaneous delivery. Child stillborn, cord pressure (?). Weight 3400 grams. Puerperium febrile. Uterine culture, saprophytes. Placenta, inflammation amnion and chorion. Died; puerperal infection with thrombophlebitis. (11543)

IV. Para iii. Placenta previa marginalis. Excessive hemorrhage prior to admission. Ten cm. bag, expelled in two hours. Immediate version. Child stillborn, excessive size. Weight 4500 grams. Died, hemorrhage. (11302)

V. Para i. Premature rupture of membranes. Prolonged labor. Intrapartum infection. Ten cm. bag, removed at 7 cm. cervical dilatation (fetal asphyxia). Manual dilatation of cervix. Version. Craniotomy on after-coming head. Weight 3940 grams. Pelvis normal. Puerperium febrile. Peritonitis. Septicemia. (*B. coli*). Died. (11199)

VI. Para i. Eclampsia. Died undelivered. Bag in situ two hours. Child died in utero. Development, eight months. (8797)

VII. Para iii. Referred from midwife. Tentative diagnosis, placenta previa. Ten cm. bag applied, and removed in four hours. (Impending shock). Reexamination showed ruptured uterus. Version and extraction through rent in uterus. Tamp-

snade. Child stillborn, macerated. Weight 4610 grams. Patient died ninth day, peritonitis. (2810)

VIII. Para i. Referred from outside physician. Intractable vomiting. Possible intestinal obstruction. Induction by bag. Bag collapsed in ten hours. Manual dilatation of cervix. Version. Child stillborn. Weight 3330 grams. Patient died first day. Shock, intestinal obstruction, phlebitis. Patient, a morphine habituée. (1499)

IX. Para i. Eclampsia. Bag collapsed in six hours. Manual dilatation of cervix. Version. Manual removal of placenta. Stillborn abortion. Patient died on the e'venth day. Septicemia and pyemia. (576)

X. Para iii. Placenta previa centralis. Patient in extremis on admission. Three hemorrhages at home. Bag expelled in three hours. Immediate version. Child stillborn. Weight 3025 grams. Patient died (hemorrhage). (13838)

Table II gives the data concerning the fetal mortality:

TABLE II

	TERM (92)	PREMATURE(50)	ABORTION(36)
I. 1. Placenta previa centralis	4	2	1
2. Placenta previa partialis	4	8	3
3. Placenta previa marginalis	9	4	5
4. Premature separation placenta	2	3	8
II. 5. Eclampsia	5	2	2
6. Nephritic toxemia	3	5	7
III. 7. Prolapsed cord	7	0	0
8. Compressed cord	2	0	0
9. Birth injury	6	0	0
10. Hydrocephalus	2	0	0
IV. 11. Inevitable abortion	0	0	8
12. Missed labor	2	2	0
13. Syphilis	3	1	0
V. 14. Fetal death during labor (cause unknown)	4	2	0
15. Maternal death in labor	0	1	0
Total fetal deaths in each group	53	30	34
Percentage deaths in each group	57.6%	60%	94.4%
Macerated	9	10	11
Corrected group mortality	44	20	23
Corrected percentage	47.8%	40%	63.9%
Total of all deaths			117 - 65.8%
Total term and premature deaths, omitting "macerated" =			64 - 45%

It is conceivable that such a net mortality could be further reduced by the elimination of fetal deaths quite obviously unrelated to the treatment under discussion, but solely eliminating the instances of macerated infants where death clearly occurred prior to the onset of labor, the figures justify the following observations:

(a) The physiologic inverse proportion between fetal mortality risk and the degree of maturity is everywhere evident. This is here demonstrable in lesions peculiar to all periods of pregnancy, such as chronic nephritis.

(b) However, the increased number of lesions characteristic of a mature pregnancy (placenta previa, syphilitic deaths, birth injuries) increases the relative mortality for the term cases.

(c) The survival of two "abortions" merely indicates that the weights were at or about 1500 grams, falling virtually in the premature group.

TABLE III

	NUMBER CASES	DEATHS	PER CENT
1. Placenta previa centralis	7	6	85.7
2. Placenta previa partialis	18	12	66.6
3. Placenta previa marginalis	26	13	50.
4. Premature separation of placenta	7	5	71.4
5. Nephritic toxemia (incl. preeclamptic)	21	8	38.1
6. Eclampsia	7	7	100.
7. Total remaining cases—inductions and accidents of labor	56	32	57.2

It then follows that:

(a) The extremes of success from the fetal standpoint fall within the toxemic group, with the best results in the nephritic class, and the poorest among the eclamptics.

(b) The hemorrhagic lesions show an average fetal mortality of about 75 per cent, varying, in the cases of placenta previa, with the extent of the lesion.

(c) The fetal mortality figures for the other complications of labor are comparable to the degrees of surgical risk which these cases ordinarily involve.

In 1906, Dr. Williams reported to the American Gynecological Society the results of accouchement forcé among the first 5000 cases admitted to this clinic. Because that period probably represents the era in which that operation attained its highest degree of technical perfection, and since that time the clinical problems have been attacked under the same general supervision, a few comparative statistics might rightly be presented.

Whereas the 1906 series included only 15 instances of balloon dilatation, accouchement forcé was employed 83 times. It was then found quite conclusively that manual dilatation by the Harris method could be unreservedly advised only under the following special conditions: (a) When the cervical canal was obliterated and the external os partially dilated and easily dilatable; (b) when it was executed with great care by an experienced operator; and (c) when placenta previa could be definitely ruled out. These limitations still hold after twenty added years of experience.

A detailed analogy between these two series of cases is impossible, because of the frequent employment of accouchement forcé in eclampsia in past years—a procedure long since abandoned in this clinic.

At the same time, it can be stated that eighty-three cases of accouchement forcé terminated in thirteen deaths (15.7 per cent), of which four were attributable to the operation (4.82 per cent), practically each group of indications offering at least one instance of

uterine rupture, complete or otherwise. Graphic comparison with the more conservative treatment under discussion is as follows:

	UNCORRECTED MORTALITY	CORRECTED MORTALITY
Accouchement forcé	15.70%	4.82%
Balloon	5.62%	2.81%

The effect upon the cervix in the cases dilated manually is compared with the results of hydrostatic dilatation in Table IV:

TABLE IV

	NO TEAR	SLIGHT	MODERATE	DEEP	PRIMARY REPAIR
Accouchement forcé	38 (45.8%)	12 (14.5%)	--	19 (22.9%)	14 (16.8%)
Balloon	28 (17.2%)	60 (38.9%)	39 (25.5%)	21 (13.8%)	6 (4.6%)

Interpretations of corrected mortality, as well as the extent of cervical lesions, are variable with the individual, and in a series of cases extending over so long a period, the opinions of many observers are included. For this reason, the figures may be misleading in certain instances; but the present statistical study would seem to indicate that, although the ideal mechanism for artificial cervical dilatation has not been found, the conservative policy of later years has materially improved the results obtained.

OBSTETRICAL HERESIES AT THE BROOKLYN HOSPITAL*

BY WILLIAM SIDNEY SMITH, M.D., F.A.C.S., BROOKLYN, N. Y.

(From the Department of Gynecology and Obstetrics of the Brooklyn Hospital)

FOR some years, it has been the custom in the obstetrical division of the Brooklyn Hospital, to manage certain conditions during labor by technic quite different from that laid down in the standard textbooks. This technic is not unknown to members of this Society and it has occasionally been criticized. The question, "What are your results?" has been asked more than once. With this question in mind, it may be interesting to hear the story of our cases over a two year period.

The obstetrical division of the gynecological and obstetrical department of the Brooklyn Hospital averages nine hundred admissions a year; ward and private patients in nearly equal numbers. There is no ambulance service connected with the hospital, yet each year there is a number of referred obstetrical emergencies. Patients are delivered by internes and clinical assistants, under supervision; by the head of the department, his associates and assistants; and a few patients are cared for by the courtesy staff. All patients, except those of the courtesy staff, are carefully supervised during labor, and delivered, as nearly as possible, by the technic which is used by the head of the department. Roughly, two-thirds of the patients are primiparae, and one-third multiparae. Nearly all the ward patients are primiparae.

With the preceding paragraph as a short analytical description of the division, let us briefly review two thousand consecutive ward and private case histories, covering a period from January 1, 1923, to April 8, 1925. We will discuss certain conditions during labor, wherein our management differs from that ordinarily practiced in the majority of the hospitals, and give a few statistics relative to this management. We will consider posterior positions of the occiput, forceps delivery, and perineal damage in primiparae. We will discuss the management of the third stage of labor in all cases; cesarean sections, maternal and fetal mortality, and puerperal morbidity relative to manual rotations and perineal incisions.

When a patient is admitted to the hospital, her prenatal record is studied and, if it is satisfactory, she is allowed to go into and to continue in labor, under supervision and with frequent visits from the doctor in charge. We try to relieve distressing pain in every patient. Several methods are used. Morphine, morphine and scopolamine, bromide and chloral per rectum, rectal analgesia (ether-oil), and gas-oxygen analgesia are all used in various types of cases.

*Read at a meeting of the New York Obstetrical Society, October 13, 1925.

If, after a patient has been in labor twelve hours, she does not then show signs of termination, a careful vaginal examination is made, probably the first one she has had since her admission, to determine if her labor is progressing satisfactorily, and to obtain all possible information relative to it, and its probable termination. If we find we are dealing with a posterior position of the occiput, we carefully consider whether this particular patient will or will not go on to a spontaneous delivery.

TABLE I
POSTERIOR POSITIONS OF THE OCCIPUT IN PRIMIPARAE

Recognized posterior positions of the occiput in 1256 primiparae	194
Spontaneous rotations	96
Manual 180 degree rotations	82
Some degree of forceps rotation at outlet	16

If we decide that the baby probably will not rotate spontaneously, and that the patient probably will come to a forceps delivery, we feel that the patient and the baby will be better off if we change the posterior position of the occiput to an anterior position. As soon as the cervix is dilated sufficiently to admit the operator's hand, we deeply anesthetize the patient with ether and, with the gloved hand and arm within the uterus, the vertex is raised above the brim, and the head manually rotated through an arc of 180 degrees to the opposite occipito-anterior position. This procedure is carried out either by a member of the attending staff, or by a clinical assistant, or an interne under supervision. If, some hours later, the patient goes on to a spontaneous de-

TABLE II
MANUAL ROTATIONS

Spontaneous deliveries	14
Forceps control	16
Low forceps extraction	27
Mid forceps extraction	24
High forceps extraction	1
Total manual rotations	82
Temporary prolapse of the cord during manual rotations	2
Hemorrhage due to interference with the placenta	0
Death or injury to the child during rotation	0
Retraction rings palpated	24

livery, well and good; if she goes to an instrumental delivery, we have an easy application of forceps. I have never observed that the mother has been harmed by this procedure. Injury to the child from pressure or pull on the umbilical cord is rare. We think of the danger to the umbilical cord in every case, and if the cord comes within touch, it is placed out of harm's way or let alone, according to the indication. Injury to the placenta is very rare. I feel sure that this method shortens many a long labor, and that less damage is done to the baby's head

and to the maternal soft parts than is done by forceps rotation. By the figures in Tables I, II, and III, I have attempted to show the incidence of this method of rotation at our clinic and to indicate our results. We have done some slight degree of rotation at the pelvic outlet by means of forceps in sixteen cases. These cases were patients who gave promise of a spontaneous rotation and partly failed. Occasionally we use De Lee's method of a tenaculum on the scalp to help a slowly rotating occiput on the pelvic floor, or we carry out a 90 degree manual rotation of the vertex in the pelvic cavity, followed by an immediate forceps extraction. Occasionally, we deliver a posterior position of the occiput as such, if the vertex has descended to the perineum and distended the vulva in that position.

You will notice that we frequently find retraction rings. We find them because we often place our gloved hand within the uterus during labor. I feel sure that those who seldom do this have but little idea how often these rings occur. They are generally found in posterior positions of the occiput with scant liquor amnii. Lack of simultaneous descent of the fetus, and retraction of the uterus seem to predispose to the formation of these rings. W. A. Michael,¹ in his article on retraction rings, notes that in most of his cases the rings occurred around the child's neck. In our group of twenty-four cases, all the rings were in that location. I will not attempt to compare Michael's statistics with ours because many of his cases were "neglected cases," while in our series they were all "managed cases." Among other things, Michael concludes that "success in management, in the words of Harper,² depends on 'early recognition, early disappearance, and early application of conservative methods of delivery.'" "Early recognition," says Michael, "presupposes early exploration of the lower uterine segment."

We are convinced that when these rings occur with the vertex in an occipitoposterior position, an early 180 degree rotation of the fetus is by far the easiest and most satisfactory method of management.

TABLE III
FORCEPS IN PRIMIPARAE

Total number of vertex presentations	1256
Delivered spontaneously	413
Delivered by forceps control	530
Delivered by low forceps extraction	243
Delivered by mid forceps extraction	64
Delivered by high forceps extraction	6

Table III gives our forceps figures, and little else need be said except to define *Forceps Control*, which is the application of forceps to the vertex after it has appeared at the vulva, and the patient has given every indication that she will deliver herself spontaneously in a short time, but with laceration. We use forceps for purposes of control after

incisions of the perineum, and we find that, by this means, we can control the vertex more surely and with less damage than by the manual method. Our definitions of low, mild, and high forceps extraction are the same as those given in the standard textbooks.

TABLE IV
PERINEAL DAMAGE IN PRIMIPARAE

Total primiparae	1328
Delivered without incision, with moderate or no laceration	456
Delivered without incision, with third degree laceration	5
Median perineotomies	672
Median perineotomies, with third degree extension	18
Lateral episiotomies	171
Lateral episiotomies, with some degree of sphincter damage	6
Third degree damage requiring a second operation	1
Guard suture used	613
Sphincter ani dilated	696
Moderate perineal infection—ultimate good union	7

A *guard suture* may be described as a double chronic suture which runs subcuticularly or a little deeper from a point two and one-half inches to one side of, and just anterior to the anus, to the middle of the perineum and just anterior to the anal sphincter where it emerges. It again runs beneath the skin and emerges two and one-half inches to the opposite side of the anus. It is then inserted half an inch above the point of last exit, meets itself at the middle of the perineum and comes out at a point half an inch above the place of original entrance. The ends of the suture are firmly tied leaving half an inch of slack.

The object of this suture is to support the perineum by taking some strain off the perineal skin and muscles. It will not always save the sphincter from laceration, but it prevents damage to the rectal wall. A large number of our primiparae have their anal sphincters thoroughly dilated under gas and oxygen anesthesia a short time before delivery. We believe this maneuver dilates some of the levator fibers and if the anal sphincter muscle is lacerated or incised it may easily be repaired at once and excellent union may be expected.

In Tables I, II, III, and IV, I have indicated our incidence of median perineotomy and lateral episiotomy in primiparae. The mediolateral incisions have been included with the medians. We incise the perineum very often. Our usual indication is when the perineum first begins to lacerate, as is shown by a small trickle of blood, or immediately preceding a forceps extraction. We use the median incision when the patient has a deep perineal body, and the lateral incision is the method of choice if the perineal body is short or if *the delivery must be rapidly executed*. A preliminary dilatation of the sphincter is done and a guard suture inserted before nearly all median incisions of the perineum. As you know, the median incisions are far easier to repair, they

heal more rapidly and cause less pain than lateral incisions. There was only one case of sphincter damage which did not heal by primary union and give a good functional result. This patient had a very edematous vulva. She probably should not have had a median perineotomy; neither should she have had an immediate repair. We consider that an incised and properly repaired perineum gives a better end-result than one which has been lacerated by distension. This statement is based on observation in the follow-up clinics and in private work. We hesitate, however, to cut a perineum which is stretching well, and which gives no evidence of lacerating. Therefore, as our figures indicate, we incise only two-thirds of the primiparous perineums. We are not greatly concerned if a thoroughly stretched sphincter muscle is lacerated or cut, because, as the ends of the dilated muscle do not retract, the repair is easy and the functional result is uniformly good. We are concerned, however, if we have sphincter damage without previous dilatation. All of our third degree lacerations have been repaired at once.

TABLE V

THIRD STAGE OF LABOR IN BOTH PRIMIPARAE AND MULTIPARAE

Cases delivered by vaginal route	1969
Postpartum hemorrhage	9
Manual extraction of placenta	7
Vaginal packs	11
Intrauterine packs	0
Complete inversion of the uterus	1

In speaking of postpartum hemorrhage, it is necessary to define what we mean by that term. We do not attempt to measure the amount of blood loss at the time of delivery. We consider a patient to have a postpartum hemorrhage, either immediate or delayed, if she shows the general clinical signs of hemorrhage which require treatment other than a second ampule of pituitrin or an injection of ergotole. In considering the method by which the third stage of labor is controlled in our clinic, we will divide the cases into two classes. First, patients who are not under anesthesia, and who have been delivered spontaneously with analgesia only. Second, patients who are under deep anesthesia. In the first class of cases we are in no great hurry to express the placenta, provided there are no signs of active bleeding; we do not give pituitrin to these patients until the placenta has been expressed from the uterus. When we see evidence that the placenta is detached, we express it and give one ampule of pituitrin hypodermically.

In the second class of cases, when the patient is under deep anesthesia, we give one ampule of pituitrin as soon as the baby is delivered. The placenta is then expressed as soon as the uterus has its first contraction; this occurs on an average of three to five minutes after the pituitrin has been given. As soon as the uterus is empty, we raise it

high in the abdominal cavity by extraabdominal manipulation. The uterus is held there for a few moments, while placing the broad ligaments on the stretch, and cutting off some of the blood supply to the organ. If it shows no signs of misbehaving, it is then let alone. If, however, active bleeding begins, the blood clots are expressed, the uterus is again raised high in the abdominal cavity and held there by one hand placed on the abdomen between the lower pole of the uterus and the symphysis pubis, and the other hand placed above the fundus. The uterus is thus held in the hollow of the operator's two hands, the broad ligaments are stretched, and the fundus is compressed at the same time. By this technic most postpartum hemorrhages can be avoided. Please note that two doctors are always scrubbed up for every delivery. This is done so that there may always be a doctor ready to care for the placenta or the baby at the proper moment as, occasionally, they both need attention at the same time. In both classes of cases, if the placenta does not come away spontaneously or cannot be easily expressed we let it alone (provided there is no active bleeding), for a period of from a few hours to twenty-four to thirty-six hours, when spontaneous expulsion usually has taken place. If there is active hemorrhage, however, we believe the uterus should be emptied at once. We anesthetize the patient and proceed to empty the uterus by manual extraction. Contact with and trauma to the placental site is avoided as far as possible. Occasionally, we place a lifting pack of zinc oxide gauze in the vagina. We firmly believe that it is *unnecessary and dangerous* to pack the uterine cavity. In cases of placenta previa, we express or remove the placenta at once, pack the vagina full of zinc oxide gauze, and put on a tight abdominal binder.

The case of complete inversion of the uterus, the only one which has occurred in my recollection over a period of many years, was incident to expression of the placenta by an inexperienced interne. He used too much force on the fundus after the placenta had begun to separate. The uterus was easily reduced at once, and the patient came to no harm, not even having an elevation of temperature.

TABLE VI
ABDOMINAL, CESAREAN SECTION

31 cesarean sections in 2000 cases = 1.55%			
Multiparae	16	Classical operation	26
Primiparae	15	Low operation	5
	<hr/> 31		<hr/> 31
Maternal mortality		0	
Fetal mortality		4 = 12.9%	
Maternal morbidity		8 = 25.8%	
<hr/>			
Sections were done because of			
Previous sections	8	First stage dystocia	2
Contracted pelvis	7	Eclampsia	5
Fibroids	5	Nephritic toxemia	3
	Placenta previa	1	

Table VI tells most of our cesarean story. These operations were performed by eight different operators. Three babies were stillborn, two being from eclamptic mothers and one being from a mother in whom the placenta was partially separated. The fourth baby died a few days after the operation. This baby was somewhat premature (birth weight five pounds, thirteen ounces), and the cause of death was not definitely determined.

The operation on the patient with nephritic toxemia was done because she was elderly; she had no living children, and this baby was valuable. Of the two patients who had first stage dystocia, one was a multipara on whom a Gilliam operation had been performed in another hospital after the birth of her last child. The second patient was an elderly multipara who had lost her first baby during a protracted labor. This labor bid fair to be similar to the first; the cervix was very slow in dilating and as the baby was especially valuable, the patient was sectioned.

Eight patients had a temperature of 100.4° F. or a little over for the first few days after the operation. They were never considered to be very ill. This morbidity is reckoned on the arbitrary basis of a temperature of 100.4° at any time during the postpartum stay in the hospital, including the day of the operation.

In reviewing any group of cases where the cesarean percentage is low, the question arises as to how many mothers and babies have been lost on account of difficult vaginal deliveries? Should we have done more sections and lost fewer babies?

These questions lead us directly to the subject of maternal and fetal mortality.

TABLE VII
MATERNAL MORTALITY

13 deaths in 2000 consecutive cases	0.65%
Causes of Death	
Pulmonary embolus	5
Nephritic toxemia (acute)	3
Eclampsia (fulminating) (undelivered)	1
Puerperal septicemia (streptococcus)	1
Long labor (64 hours) shock—retraction ring	1
Concealed hemorrhage	1
Peritonitis following vaginal hysterotomy for nephritic toxemia	1
	<hr/> 13

Two of the cases of embolus occurred during the course of broncho-pneumonia, one during a pyelitis and one in a multipara during labor, who had multiple small fibroids on her uterus. She died during labor. The fifth case of embolus came on the eighth day of an apparently smooth puerperium.

One of the nephritic toxemias had an almost complete anuria when

admitted, but no convulsions. She aborted a six months' fetus in a few hours, and died twelve hours later. The other two nephritic patients had been carried along with the hope that the fetus might reach the stage of viability. However, it was necessary to induce labor at the sixth month. In one case, marked anemia was a complication, and a small blood loss proved fatal eight hours after delivery. The other patient died two days postpartum. The eclampsia patient was about eight months pregnant. When admitted she was having convulsions in rapid succession, and the fetal heart soon ceased. She had a phlebotomy and a heavy morphine dosage but rapidly grew worse, and died a few hours later. The long labor case may have been one upon whom a cesarean section should have been performed. She had a sixty-four hour labor, and first stage dystocia due to a posterior position and a retraction ring. She was subjected to a manual rotation of the fetus through an arc of 180 degrees, and later a difficult mid-forceps extraction was performed. After delivery the maternal pulse rose to 180, even though the blood loss was slight. She became rapidly worse. Mother and baby died about six hours after delivery. The concealed hemorrhage case occurred in an extremely stout Italian multipara at about the seventh month. There was some apparent hemorrhage, and after a diagnosis was made of partial premature separation of the placenta the membranes were ruptured. She promptly went into labor but, owing to the excessive abdominal fat, the steady increase in size of the fundus uteri was not noted until just before delivery. The patient died a few moments after the birth of a stillborn child which was followed by an enormous amount of liquid and clotted blood. The death from puerperal septicemia (*Streptococcus hemolyticus*) occurred in a multipara admitted in the second stage of labor. She had a spontaneous breech delivery fifteen minutes later. On the second day postpartum she developed a septic temperature of 105 degrees with chills and foul lochia. Death occurred on the ninth day postpartum.

FETAL MORTALITY

Out of the two thousand consecutive cases of labor there were 134 babies stillborn or who died in the hospital before the mother was discharged. Fifty-eight of these babies were premature, weighing between one pound and five pounds, and I will not give them further consideration.

There remains a group of 76 fetal deaths in babies weighing over five pounds or a chargeable fetal mortality of 3.8 per cent.

In this group there were 42 stillbirths and 34 babies who died before the mother left the hospital.

In these two thousand cases the maneuver of manually rotating the child through an arc of 180 degrees has been executed 82 times. Ten babies have died from labors in which this procedure was practiced.

TABLE VIII

76 babies weighing 5 pounds or over	3.8%
42 stillbirths	2.1%
34 fetal deaths after delivery	1.7%

TABLE IX

CAUSES OF FETAL DEATH IN RELATION TO PATHOLOGY OR IN RELATION TO METHOD OF DELIVERY

Long labors—posterior positions in primiparae with manual rotations of 180 degrees, retraction rings, and forceps extractions	10
Long labors with forceps extractions in primiparae	8
Breech deliveries—multiparae	2
Breech deliveries—primiparae	7
Maternal toxemias and eclampsias	9
Cord pressure, including 2 cases of prolapsed cord (not rotation cases)	7
Premature separation of placenta	8
Placenta previa	7
Cerebral hemorrhage or undetermined	18
	<hr/> 76

Fetal death was not due in any one of these cases to prolapsed cord or to interference with the placenta. Death was due, in five cases to intracranial hemorrhage, as proved by autopsy; in four cases death was probably due to the long, hard labor, and very probably to brain trauma, and the tenth baby died because the cord was tight around the neck at delivery. I think, therefore, that it is fair to say that the procedure of 180 degree manual rotation, per se, has not been responsible for the death of any baby in this group. We would have undoubtedly saved many of these eighteen babies who died from long, hard labors, if we had done more cesarean operations, but there was no serious bony dystocia in any of these young primiparous patients, and the probability is that their second labor will go fairly smoothly while, if they had been sectioned with the first labor, this major operation would be in order for the second.

PUERPERAL MORBIDITY IN RELATION TO INCISIONS OF THE PERINEUM AND MANUAL ROTATIONS

Puerperal morbidity as a whole is a subject so large that I will not attempt to discuss it except in relation to incisions of the perineum and manual 180 degree rotations.

The definition of puerperal morbidity used is the same as that used by R. S. Siddall³ and later by H. W. Mayes,⁴ namely, any postpartum case in which the patient's temperature remained at or above 100.4° F. on two successive days during the first ten days of the puerperium not including the day of delivery.

In these 2000 consecutive cases of labor, 82 had manual 180 degree rotations. Fifteen of these had morbidity. In these 15 cases a possible

cause of morbidity was as follows: phlebitis of the femoral vein, 2; low grade perineal infection, 3; metritis, 2; incisions of the cervix, 1; fibroids, 1; manual extraction of the placenta, 1, and long hard labors, 5. I cannot say that the intrauterine manipulations had nothing to do with causing the above 15 cases of morbidity, but I can say that we have records of 67 other cases of manual rotation in which there was no fever or other untoward reaction.

My observations on morbidity after incisions of the perineum are that out of 672 median and mediolateral perineotomies and 171 lateral episiotomies in this series of cases, only 75 median and 37 lateral incisions had morbidity. Furthermore, this morbidity is by no means entirely chargeable to the perineal incisions. As far as figures are concerned, we have records of 597 median perineotomies, and of 134 lateral episiotomies in which there was no fever.

SUMMARY

1. Manual intrauterine rotation of the fetus in selected cases, whereby the position is changed from an occipitoposterior to an occipitoanterior through an arc of 180 degrees, does no harm to the mother and but rarely jeopardizes the child. It is of great benefit to mother and child because of the shortening of labor and because of the diminution of trauma when the labor is terminated.

2. Conservative vaginal delivery, rather than a too frequent resort to cesarean section, justifies the occasional loss of a baby in young primiparae.

3. If a patient is delivered under deep anesthesia, the principle of expressing the placenta at the first uterine contraction and keeping the uterus empty thereafter is essential in the prevention of postpartum hemorrhage.

4. It is not in evidence that incisions of the perineum or manual rotations of the fetus in utero are a major causative factor in producing puerperal morbidity.

REFERENCES

- ¹Michael, W. A.: AM. JOUR. OBST. AND GYNEC., 1925, x, 1, 111.
- ²Harper, Paul: Am. Jour. Obst., 1913, lxxviii, 640; Am. Jour. Obst., 1916, lxxiii, 15; Surg., Gynec. and Obst., 1922, xxxv, 198.
- ³Siddall, R. S.: Surg., Gynec. and Obst., 1925, xl, 282.
- ⁴Mayes, H. W.: AM. JOUR. OBST. AND GYNEC., 1925, x, 1, 61.

370 WASHINGTON AVENUE.

(For discussion see page 414.)

THE INCOMPATIBILITY OF PREGNANCY AND FIBROIDS OF THE UTERUS*

BY GEORGE CLARK MOSHER, M.D., KANSAS CITY, MO.

THAT any difference of opinion should exist among writers regarding patients with uterine myomas in connection with pregnancy and also as to the probable outcome of the combination of these conditions, would be surprising, unless one went thoroughly into the literature. Yet on careful examination of the subject, one is at once struck by the varied interpretations that authors have given to these manifestations during the last thirty-five years.

In a review of the literature it is interesting to note that both Goetze and Troell, in their articles in the *Zeitschrift für Geburtshülfe und Gynäkologie*, used the identical title I have today chosen. There is to this extent, already unity of viewpoint.

There was formerly a question as to whether fibroids degenerate into malignant tumors. Now it is determined that sarcoma may co-exist with a myoma, but carcinoma, being epithelial, is not considered by most gynecologists, as even a possible complication, save as a rare coincident lesion.

Our idea as to "fibroid heart," which years ago, was the one symptom universally accepted and especially dreaded during pregnancy, has changed. We do know that many patients suffering from fibroids, have died of heart lesion, but these have been incidental, and not *quid pro quo*.

Spiegelberg, in 1890, considered abortion as the final resort, in case of a tumor encroaching on the brim of the pelvis, since cesarean section, the only alternative, was fraught with such a high maternal mortality, that the prognosis was very grave in case the abortion were not done. Hysterectomy was subsequently done, as a routine, in pregnancy with myoma. As late as 1909, the case was generally considered as one of the fibroid alone, ignoring the concomitant risk of the unborn patient.

The experience of observers is so varied and the conclusions in many instances are so wide apart, that like all these elder topics which have a perennial youth, it would seem that each of us should add his own cases to the general knowledge in the hope that finally, we may arrive at a more harmonious acceptance of the truth concerning the subject of which so much has been written.

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Hot Springs, Va., September 16, 17, 18, 1925.

The striking fact that there is an incompatibility is demonstrated by: (1) The frequency of sterility associated with fibroids; (2) the tendency to abortion and premature labor in these subjects, and (3) the stormy experience which these patients endure in pregnancy, owing to obstruction at the brim of the pelvis, to pain, to hemorrhage and to sepsis. To these must be added the possibility of degenerative change, owing to the extraordinary nutrition to which the uterus is subject, by increased blood supply in pregnancy. This increase may also be exaggerated by edema.

There is no question that the vast majority of these cases is not recognized, as no pronounced symptoms are presented. The diagnosis may be easy or difficult, owing to the situation, form, and size of the tumor. If smooth and molded to the uterus, it may be difficult of diagnosis; while on the other hand, nodulated tumors may be easily identified. In the first four or five months of pregnancy, the recognition of the myomatous condition may be, as a rule, impossible. If at midterm, or later, one may usually be quite certain of the diagnosis, unless the fetus is deeply imbedded in tumor tissue.

A phantom tumor, anterior, has been met by several observers (notably described by Bar) where by repeated examinations one could be sure the tumor was not a myoma, though the symptoms of swelling, pain and tenderness all indicated myoma. This mistake, as between pregnancy and fibroid, is also to be borne in mind. A rapid growing myoma may simulate a pregnancy.

The important symptoms of pregnancy—softening of the cervix, blueness of vaginal mucosa, suppression of menses—should always be kept in mind, in differentiating between pregnancy and myoma; of course the fetal movements and fetal heart, in later months, make the diagnosis absolute.

Fibroids may increase greatly in size, due to their hypertrophic growth and also to edema. They will soften and flatten, becoming difficult to discern in the later weeks of pregnancy. In case the patient has not been under careful observation, the tumor may not be detected until after delivery.

The fibroid, if low down in the uterus, will often rise above the brim in the first stage of labor, even if so low that it seems to cause obstruction to labor.

We are still at sea between the points, as to whether sterility causes fibroids, or whether it results from the myomatous condition. From the reports on pathologic laboratory examinations of the female patients, dying from all causes, in the Boston City Hospital and the Johns Hopkins Hospital, it appears that 10.5 per cent of all women, show at postmortem, some degree of uterine fibroids. Olshausen's figures are that 31 per cent of women with fibroids are sterile, while other statistics show 8 and 10 per cent of all women as sterile.

In the case of interstitial fibroids we expect sterility to follow. Subserous fibroids are not so prone to affect fertility. This is the teaching of most authorities. It is conservative to say that 25 per cent of all women, subject to myoma, are sterile.

One child sterility drives the patient, after a period of five to ten years, to consult her physician for a cause. A careful examination will perhaps reveal, in that case, the diagnosis of intramural or sub-mucous fibroids. It was a French physician who said, in the case of a patient complaining of sterility, "*Cherchez la fibromyoma.*"

Pinard found 0.7 per cent of fibromyoma in thirty-one thousand deliveries, during a period of ten years at the Clinique Baudeloque.

In Glasgow Maternity Hospital, in ten years, thirteen thousand deliveries developed, 4 cases requiring abdominal section for fibroids.

In France, of fourteen thousand deliveries, myomas were found in 84 cases, of which 66 went to term. Thirteen were premature labors and five aborted.

One would naturally expect, from the pressure of myomas in the uterus, a predisposition to hemorrhage and abortion. Kerr is inclined, however, to believe that these results are surprisingly infrequent, considering his experience. The most important disturbance, and the one most generally furnishing indications, is pressure; the uterus and the growing tumor increase to such size and extent that the surrounding organs (bladder, urethra, and bowel) are hampered in function; also the circulation in the larger veins is interfered with, and finally, by enormous growth, cardiac and respiratory embarrassment results. As to implantation of the placenta, Olshausen says its frequency over the tumor is more than a coincidence. He thinks it is a thickening of the mucous membrane, over the portion of the tumor, bulging into the cavity, which favors the implantation of the ovum in that locality.

Spontaneous rupture of the uterus by fibroids is very much doubted. Interference with the progress of the labor may follow, by mechanical hindrance of the passage of the child through the parturient canal and by distention of the uterus, favoring malposition and malpresentation.

As regards dystocia, the position of the tumor is more important than the size. Those of cervical origin and pedunculated myomas are most difficult.

Dystocia may result from an unfavorable position assumed by the fetus. These result from the tumor being in the lower part of the body or cervix. Placenta previa is to be anticipated as a more frequent complication in myomas than in a physiologic uterus.

Owing to the change wrought in the mucosa associated with sub-mucous fibroids, there is also a greater tendency to metrorrhagia.

Premature labor has also been found to result from the undue pressure of a fibroid.

It is doubtful whether any case of uncomplicated fibroid ever justified induction of an abortion. While abortion, as stated, may follow fibroids, still many patients go through pregnancy, carrying to term in spite of a large fibroid, or multiple fibroids.

The question of treatment of a fibroid tumor in pregnancy resolves itself into determining whether the life of the patient is endangered by allowing the growth to remain, or whether the health of the patient is to be seriously disturbed. In the interest of the child, interference should be delayed as long as possible. Generally, if the tumor decidedly obstructs the parturient canal and cannot be displaced, it should be removed. All tumors injured during labor, or showing marked signs of degeneration, should be at once removed.

The reasons for interference with fibroids complicating pregnancy are pain and hemorrhage; also, there is a secondary source of disturbance,—irritation from peritoneal adhesions, which becomes so distressing as to call for relief. The pain is over the site of the uterus. It is persistent and may become unbearable. Rest in bed, with attention to bowels and kidneys, holding in reserve the aid of sedatives which are to be used when indicated, are the steps to be followed before radical interference. Hemorrhage, which appears like a threatened abortion, may be encountered. Irregular metrorrhagia has been noted during the first three months.

Farquar Marshall never encountered severe hemorrhage in this type of case, except in actual abortion.

The case to be treated by myomectomy is one with torsion of subserous fibroid, with necrosis, or a prolapse of subserous fibroids in the pelvis, or an anterior fibroid forcing the uterus into ante flexion, and likely to cause abortion. Myomectomy, which Lynch calls "a surgical curiosity," limited certainly to a narrow field, should only be considered as a conservative measure in young patients. Winter, quoted by DeLee, gives the percentage as 17.

No interstitial fibroid with pregnancy should be removed by myomectomy, nor one which involves an opening through to the membranes. Statistics vary as to abortion following myomectomy. No single surgeon has sufficient experience to make his individual findings valuable. However, as Marshall says, myomectomy, even if it is followed by abortion, leaves the patient with her uterus for possible future pregnancy.

The patients requiring hysterectomy are women near the menopause; also, those with large fibroids, which if situated in the pelvis, give rise to severe pressure symptoms, causing much pain. No expectant treatment, or abortion is here available. Hysterectomy is the only plan of treatment.

With a single tumor and no symptoms, it should be left severely alone. In this way, many cases come to term. Pain is the outstanding symptom; even in addition to the size of the tumor, it may prove intolerable, so that removal is necessary.

If the patient passes through her labor without undue suffering, normal presentation may result, although we find a preponderance of abnormality. The figures of Lynch as to presentation are: cephalic, 59 per cent, breech, 22, and transverse 18 per cent. Olshausen gives his presentations, 53 vertex, 24 breech, and 19 transverse. These observations show a remarkable conformity.

Precaution must be observed in delivery to determine whether obstruction is insurmountable. If a cesarean section is done under the circumstances, authors advise immediate hysterectomy, unless the tumor seems such that subsequent myomectomy may be done, and the uterus left for future pregnancy. No attempt to pull the head of the child through the pelvis, obstructed by a large fibroid, should be made, as the child may be killed and the mother later die from shock. The crushed bruised fibroid is also liable to necrosis.

In the third stage of labor the conditions to be feared are: first, hemorrhage, and later, sepsis. Hemorrhage may be immediate, postpartum, or later in puerperium. This should always be guarded against in the management of this complication.

Williams quotes Schauta, as finding 54 cases spontaneous and 30 requiring help. The maternal mortality was 3.

Sepsis is fortunately more rare than hemorrhage. Bruising by forceps delivery, version, or faulty curettage, is liable to cause sloughing.

Usually, after the danger of postpartum hemorrhage is passed, the puerperium runs a favorable course.

Fibroids usually diminish in size and harden during involution; frequently the tumor shrinks so that it is no longer palpable.

The placenta may be retained, and is often difficult to remove, especially if blocked by growths or displaced by hypertrophy of the musculature.

Faulty contraction and retraction preventing normal thrombosis, may result in hemorrhage.

Kelly and Cullen found in their series of studies that practically 50 per cent of women, with fibroids associated with sterility, included co-existent tubal and ovarian disease; so that the question, as to which condition was antecedent, remains still *sub judice*. The sterility may cause a fibroid, or the fibroid may result in sterility. In these calculations sterility due to the husband, and also venereal infection may have some responsibility, which must be calculated.

The question of sterility is dependent, to some degree, on the position of the fibroid. In Schorler's cases 48 per cent were subperitoneal, 39 per cent submucous, 24 per cent interstitial, 17 per cent cervical.

Young and Williams found that 27 per cent were interstitial, 31 per cent submucous and 42 per cent subserous; on the other hand, 91 per cent of cases of fibroid, which Goetze found submucous, were in women who had borne children. Sterile women seldom develop tumors of submucous type. Kerr insists that fibroids usually cause sterility, and conversely a barren uterus is more prone to fibroids. This may explain the number of cases of coincidence. It is his opinion, that pregnancy is more likely if there is no encroachment on the uterine cavity, so the growths of subserous and interstitial type are more frequently found coexistent with conception. If a submucous neoplasm is complicated by pregnancy, the placenta may be found attached to the tumor. His observation is however at variance with that of Goetze.

Lynch calls attention to the fact that fibroids are most numerous in the fifth decade while pregnancy is most common in the third. The twenty years between, may allow for many developments, which are not necessarily interdependent.

Gusserow wrote that, prior to 1880, abortion occurred in 21 per cent of cases of pregnancy complicating fibroids. It was not clearly stated, as to whether this percentage was an abortion of artificial origin, or whether it was spontaneous. Pozzi, in 1909, said the percentage was 6, while Chahbazian gave his findings, as spontaneous, 13 per cent.

The abortion is far more likely to occur in submucous, than either the interstitial, or subserous variety.

The conclusion of Sneed, of the Mayo foundation, reported in *Surgery, Gynecology and Obstetrics*, September, 1925, is that 13 per cent of fibromyomas undergo some form of degeneration and calcification. His studies show that little evidence exists that any benign degeneration of myofibromas produce toxic effect on the other organs.

Prof. Frankl, in his paper, on "The Coincidence of Tumors," read before the Cleveland meeting of the Association, made some very striking observations, drawn from his extensive material of 1878 cases of myoma. He finds that myoma diminishes the number of pregnancies, while sarcoma without myoma has no such influence, and claims that sarcoma may coexist with fibroids, or may develop in myoma, and that carcinoma and myoma may occur simultaneously but independent, or the one may grow with local interrelationship, also in the combination. The average age and number of pregnancies of patients with myoma and carcinoma do not differ from the preferred age of those women with cancer but without fibroids.

Dr. Ill said, in his discussion of Prof. Frankl's paper; "If only adenofibroids can develop carcinoma, and if the pathologist of the Buffalo Cancer Institute found only 18 cases of malignancy in two thousand examinations, and if there are five hundred thousand women, over thirty-five years of age, in New York alone, who have fibroids, the fact of malignancy coexistent with myoma is certainly rare enough to

afford some protection to the women of this country, who may have symptomless fibroids, and many of whom may become pregnant; and, as shown, by competent reports, the majority may never be aware of the complication."

The figures which are available show that the incidence of pregnancy in women, subject of myoma and coincident malignancy, do not differ from the sterility of those with fibroids, but free from cancer.

DeLee, in four thousand deliveries, at the Chicago Lying-In Hospital, reports two cases of carcinoma of the cervix.

Bland Sutton is quoted as authority for the statement, that 10 per cent of women who require hysterectomy for fibroids, have demonstrated malignant disease after fifty.

Carsten's five hundred and sixteen cases, with hysterectomy in 48 per cent before the child was viable, indicates how general hysterectomy was, prior to 1909. The case was considered simply one of fibroids. Lobenstine's report of one hundred cases with eighty-five coming to term, with absolutely spontaneous labor in 75 per cent, shows a vivid contrast for the present-day management. Troelle's cases resulted in spontaneous deliveries in 68 per cent; Pinard's figures are almost equally as valuable as an object lesson,—65 per cent presenting normally, and being delivered with no untoward development. These are an unanswerable argument for conservative treatment, in cases which show no definite indication for interference.

It is not the design to discuss here, all the cases of the coexistence of myoma with pregnancy, which have come under our observation, but only those most striking examples which stand out preeminently as having required interference.

From these it is demonstrated that sterility, abortion, hemorrhage, mechanical obstruction, degeneration and infection may be encountered in the experience of the obstetrician, who has this combination presented as a clinical problem.

The following cases are cited, as evidence of the contention.

CASE 1.—Mrs. G. H. D., aged thirty-two, para iv; seen in consultation with Dr. Chas. H. Lester, in the home, in prehospital days. The patient was at term, and in severe labor. She had been bleeding profusely for several hours, and the cervix, on examination, was found to be blocked by a mass which proved to be a pedunculated, subserous myoma. We were able to push the tumor up, out of the canal. Exaggerated Walcher position was helpful, in keeping the fibroid above the brim, where it was held until the child was brought down; forceps were applied, and a live birth ensued. This case was delivered in 1898, and the mother has gone, without operation, through an uneventful life history, during a quarter of a century; she passed her menopause without difficulty, and recently told me that she had just returned from Philadelphia, where she attended the wedding of the boy, whose arrival so nearly resulted in a tragedy.

CASE 2.—Mrs. W. G. S. was a para ii; her first pregnancy and labor under our care in 1922 having been normal. In 1924 she presented herself for prenatal care and no untoward symptoms arose until the sixth month when the measurements

of the uterus began to increase at an abnormal rate, but without symptoms. Indications of premature delivery arose. She was sent to the hospital and after four days attempt to carry on until viability she aborted. The cause of the enlargement then became at once apparent. It was a general multiple interstitial fibroid of the uterus. No nodular prominences were discernible but the mass persisted 10 cm. above the umbilicus. In the absence of symptoms, involution was allowed to proceed as best possible, and after eight weeks, abdominal hysterectomy was done, by Dr. Howard Hill, the patient having a short and satisfactory convalescence.

CASE 3.—Mrs. G. P., a primipara, aged forty-one, who found herself, while abroad in May, 1925, passing the third period, consulted physicians in two cities in Spain, but was unable to obtain any satisfactory information as to her condition. Having cabled her physician, Dr. B. L. Sulzbacher, of Kansas City, she was advised to visit Dr. Landau, in Berlin; Dr. Oskar Frankl in Vienna; or Dr. Henri Vignes, in Paris. Constant vomiting and pain, a rise of temperature, with loss of fifteen pounds weight in two weeks, so alarmed her husband that he again cabled and was advised to bring her home at once, which was done.

In consultation with Dr. Lindley Milne, the internist, and myself, it was decided that a pregnancy in conjunction with interstitial fibroids existed, and the question of myomectomy or hysterectomy was left for the final determination, after the abdomen was opened. The uterus was found in a state of general fibroid degeneration and was removed. The patient made an uneventful recovery.

CASE 4.—Mrs. G. G., age thirty-five years, of Topeka, Kansas, had a tempestuous history. At the age of nine years, a diagnosis of appendicitis was made, and operation disclosed a right dermoid cyst. Persistent dysmenorrhea was suffered throughout her menstrual life. She married at the age of thirty-five, and four months later was found to be pregnant. Coincident with the pregnancy, multiple subserous fibroid tumors were diagnosed when she was seen at the fourth month. Repeated symptoms of abortion at fifth and sixth month, which necessitated keeping the patient in bed for six weeks under morphine, demonstrated that she was jeopardized by longer attempt at carrying the pregnancy nearer to term, so hysterectomy was regretfully done. The patient made a very satisfactory recovery, and has been apparently in good health ever since 1923. She recently made a trip to New York where she adopted a child.

CASE 5.—A patient Mrs. G. W. C., age thirty-six, from a near-by town, where her husband was a member of the faculty of a college, consulted Dr. J. F. Binnie and myself, as to her symptoms, which included an enlargement, which had persisted and increased for five months, with suppression of the menstrual flow. No evidence of fetal heart nor fetal movements could be elicited, although other symptoms of pregnancy, bluish vaginal mucosa, nausea and vomiting, and softened cervix were in evidence.

It was decided that hysterectomy should be done. On incision of the uterus, a small fetus evidently about the tenth week of gestation was disclosed. No reason for the failure of the development, after that date, could be discovered, except that the uterus may have pressed upon and thereby cut off its nutrition.

CASE 6.—Mrs. A. P. T., a para iv, aged forty-two, was sent from Artesia, New Mexico, on account of a mysterious increase of an enlargement in the abdomen. She had noticed herself increasing in size for several years. She suffered great pain constantly and was distressed by insomnia and dyspnea, which were increasing in severity. She had been examined, by local physicians, four months previously, but no positive diagnosis could be made, as between a tumor and pregnancy. She was increasing enormously in size, and had no subjective signs of pregnancy. After several conferences which followed clinical examinations held on successive days,

it was decided in view of her symptoms to open her abdomen. A large ovarian cyst was found, and a fetus of the fifth month of gestation, in a uterus completely studded with multiple intramural fibroids. The fluid of the cyst prevented a clear field of exploration by palpation. The fetus was living, but of course soon expired. A physician who saw the patient, after she had left her home, but before she came to the hospital, said she was diabetic. We found no symptoms of glycosuria. The hysterectomy was done for relief of pain. A letter from the husband recently, gives the patient's health, after five years, as being excellent, since her operation.

CASE 7.—Mrs. W. L. B., aged thirty-one, was delivered by forceps, of a normal fetus March, 1919. The uterus being found abnormally increased in size post-partum, a diagnosis of submucous fibromas was made. Owing to this condition she bled freely, but involution was satisfactory. No other untoward symptoms occurred except profuse menstruation, until June, 1921, when, with a sudden gush of blood at 2 A.M., occurred the onset of an abortion at ten weeks. She was reminded of her fibroid condition, and urged to have an operation for the tumor but demurred. In June, 1925, a hemorrhage occurred after two missed periods; a neighboring physician was called in, who advised rest in bed. On the next Friday, a recurrence in the bleeding caused an alarm, and the nearest doctor was summoned, who packed the vagina for the hemorrhage. Sunday morning, I was called, and I found the patient almost exsanguinated. She was at once sent to the hospital, the uterus packed, and ice bag and morphine ordered. Monday, the packing with debris of the pregnancy was removed. The remainder of her stay was uneventful, and the question of ultimate treatment is to be determined by the condition which is shown by development in the next few months. No unusual symptoms have occurred in July or August periods. She was last seen September 2, 1925.

CONCLUSIONS

Pathology of myoma and fibromyoma in pregnancy will be indicated by pain, hemorrhage or signs of degeneration. Rise of temperature, or a high leucocytosis being an evidence of the latter.

If the tumor be situated at the brim, so as to constitute absolute, or even relative dystocia, operation is to be considered, either by myomectomy or by hysterectomy according to condition encountered.

Abortion is not to be considered as an expedient in case of a pregnancy complicated by fibroids on account of increased risk of hemorrhage, traumatic injury, and septic infection.

No doubt cesarean section is done in many instances without proper indication.

The great majority of cases of fibroids in conjunction with pregnancy run a favorable course, after the immediate danger of post-partum hemorrhage. The tumor rapidly diminishes in size, and in some instances has seemed to disappear, or become so small as to be no longer palpable.

Each case must in every instance be individualized, and the result is dependent on the judgment and skill of the operator.

REFERENCES

- Duncan: *Sterility in Women*, Edinburgh, 1883.
Scholler: *Ztschr. f. Geburtsh. u. Gyn.*, 1885, ii, 140.
Kelly and Cullen: *Myoma of the Uterus*, Philadelphia, 1909.

- Zinke, E. Gustav: *Am. Jour. Obst.*, 1902, xlv, 623.
 Goetze: *Ztschr. f. Geburtsh. u. Gyn.*, 1910, lxvi, 2345.
 Troell: *Studien über Uterusmyom.*, Stockholm, 1910.
 Lynch, Frank W.: *Pelvic Neoplasms*, D. Appleton and Co., N. Y., 1923.
 Idem: *Am. Jour. Obst.*, 1913, lxviii, 427.
 Young and Williams: *Boston Med. and Surg. Jour.*, 1911, xi, 30.
 Mayo, Wm. J.: *Jour. Am. Med. Assn.*, 1911, lxviii, 887.
 Kosmak, Geo. W.: *AM. JOUR. OBST. AND GYNEC.*, 1923, vi, No. 1, 63.
 Ill, Edward J.: *New York Med. Rec.*, June 1, 1918.
 Marshall, G. Balfour: *Glasgow Med. Jour.*, February, 1922, xevii, No. 2.
 Bailey and Bagg: *AM. JOUR. OBST. AND GYNEC.*, May, 1923.
 McIlroy, A. L.: *London Lancet*, Oct. 9, 1923, p. 784.
 Kerr, J. M. M.: *Edinb. Obst. and Gynec.*, 1923.
 Williams, J. Whitridge: *Obstetrics*, D. Appleton and Co., New York, ed. 5.
 Davis, Edward P.: *Tumors Complicating Pregnancy*, D. Appleton and Co., New York, 1923.
 1100 GRAND AVENUE. (For discussion see page 404.)

TREATMENT OF FIBROIDS OF THE UTERUS*

OBSERVATIONS BASED ON A COMPARATIVE STUDY OF TWO FIVE-YEAR PERIODS

BY EDWARD A. WEISS, M.D., F.A.C.S., PITTSBURGH, PA.

(From the Gynecological Department of Mercy Hospital, Pittsburgh, Pa.)

THE treatment of fibroid tumors of the uterus constitutes such a large proportion of the work of every gynecologist of experience that it would seem to have become fairly uniform and definitely established. However, visits to various gynecologic clinics in this country and in Europe during the last five years have shown that there still exists a marked difference of opinion regarding the treatment of these tumors. Many gynecologists adhere to the well-established surgical treatment either by myomectomy or hysterectomy; others are ardent advocates of radiation, while a third group are definitely conservative and employ both methods.

In order to satisfy ourselves as to the relative value of both methods, we have made a very careful analysis of our own records by means of a comparative study of our work, particularly the end-results of two five-year periods, from 1915 to 1925. When radium was first used in these cases, we were very skeptical about its value but by following the teaching and work of others we became gradually convinced of its efficacy and now, as in most other gynecologic clinics, we employ it with much confidence, but always with a keen appreciation of its limitations.

We believe that a careful analysis of the end-results of a large number of cases will reveal facts that escape ordinary observation of individual cases. We have learned that no dogmatic rule can be safely

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

applied to all cases, and that here as in every branch of medicine, each case is a rule unto itself. In our work we have closely followed the teaching of Dr. John G. Clark and his associates, who have given the closest study to every case before instituting treatment. We have endeavored to formulate our conclusions by grouping cases and studying them from various standpoints such as age, social condition, contraindications, type of operations, radium dosage, failures, and mortality.

TABLE I
AGE PERIOD OF OPERATIVE CASES

AGE	1915	1916	1917	1918	1919
Less than 20	—	—	1	1	
20 to 30	4	3	8	7	5
30 to 40	24	27	24	25	26
40 to 50	27	21	25	30	46
50 to 60	4	8	3	4	8
Average	42	41.8	40.3	39.6	41.5

AGE INCIDENCE

In Table I the grouping is according to the age of the patient and we have found practically the same age incidence as observed by others. The average age of all patients requiring operation or treatment was about forty years, the youngest twenty and the oldest seventy. The average age of those not operated upon or treated and whom we term observation cases, was thirty-four. Nullipara constituted 78 per cent of the group while 12 per cent had one child and the remaining 10 per cent had had two or more pregnancies.

TABLE II
TYPE OF OPERATION IN YEARS 1915 TO 1920

	1915	1916	1917	1918	1919	TOTAL
Hysterectomy (Supra-vaginal)	48	42	46	57	70	263
Myomectomy (Abdominal)	13	15	19	11	14	72
Resection of Uterus	2	3	5	2	2	14
Hysterectomy (Vaginal)	4	3	3	2	2	14
Myomectomy (Vaginal)	3	2	5	1	4	15
Radium	0	0	0	0	0	0
Deaths	2	1	3	2	2	10
Observation cases	18	12	15	17	12	74

The tabulation of fibroid cases (Table II) in the first five-year group shows that our observations and proportions of the various types of operation are very similar to those in other clinics, the only possible difference being that our percentage of purely "observation" cases was higher than the average. In explanation it may be said that the majority of these patients were individuals who were intelligent and who would cooperate by reporting at stated intervals for examination. We were careful to keep them free from anxiety, principally by assuring

them that although a tumor was present it was not of a cancerous nature,—a fear that most women share.

The treatment of uterine fibroids and the adnexa depends upon several factors, and in many instances the patient should help decide the method to be employed. This is particularly true with reference not only to the preservation of the childbearing function and ovarian balance, but also as to menstruation. When the tumor is large and when associated complications of the adnexa render conservative or palliative treatment unsafe, radical removal only is to be considered. Likewise the age, the general state of health, the social, and financial status of the patient often indicate radical removal rather than palliative treatment.

Contrary to the view held by many, we are of the firm opinion that many fibroid tumors of the uterus do not require treatment. It has been our general rule that tumors that are small and *not causing symptoms* may be safely let alone. However, we always insist that reexamination should be made at least every six months. The time for examination is not left to the discretion of the patient, but a definite appointment is made, and should the patient fail to appear, a reminder is sent to her, otherwise she may rely on false security. We have followed this "observation" plan most satisfactorily for several years and in addition to its being pleasing to the patient, it has taught us much.

It is interesting to note that of these ninety-four observation cases, eighteen subsequently became pregnant with no untoward results. In one instance, the tumors grew rapidly during pregnancy and some concern was felt. The question as to cesarean section arose, but the patient was delivered safely with only a moderate postpartum hemorrhage. Hysterectomy was performed eight months later. One patient aborted at the third month but within one year again became pregnant and went to term. Five of the eighteen patients were since operated upon and three have been treated with radium on account of the increased menstrual bleeding.

MYOMECTOMY AND PREGNANCY

In our series of 159 abdominal myomectomies and 65 vaginal or a total of 224 myomectomies during the past ten years, fourteen patients who had never been pregnant, after three to seven years of married life, later became pregnant and went to term without complications. In one of these patients, more than ten tumors varying in size from a small olive to a large orange were removed. In another, an intraligamentary tumor larger than a three months' pregnancy, was enucleated and several smaller ones were removed from the fundus. One patient who became pregnant developed influenza after six months and died, while a third aborted at four months while desperately ill from pneumonia. Eight other patients who had children previous to oper-

ation became pregnant after myomectomy. In all, 232 patients were treated conservatively with generally satisfactory results.

Of those who did not become pregnant after myomectomy a follow-up examination and questioning revealed that most of them employed some method of contraception, being influenced in most cases by the ill advice of friends who frightened them by tales of danger to mother or child or both after such an operation. In this series of myomectomies, there was recurrence of symptoms, such as dysmenorrhea and menorrhagia, in fourteen cases, and three others in whom the bleeding was very free. Hysterectomy was performed in one and eight others were treated with radium in full dosage, which caused a prompt cessation of the symptoms. These cases demonstrated that although a conservative plan was not always a success, yet the patient had the satisfaction of knowing that she had not sacrificed her organs at the first operation, and she was reconciled to have radium treatment or a radical operation.

RESECTION OF THE UTERUS

In fourteen patients who were under thirty-five years of age and in whom, notwithstanding the presence of multiple tumors the preservation of not only the maternal function but the menstrual function was desirable, we followed the teaching of Dr. X. O. Werder, and performed what he termed a resection of the uterus. In these cases the tumors were so numerous and large that simple enucleation was not sufficient, and it became necessary to remove portions of the uterine body and even part of the endometrial surface, leaving only sufficient mucosa to carry on the menstrual function and at the same time not entirely destroying the possibility of childbearing. The results obtained in this group were generally satisfactory for several years, only three of the patients requiring subsequent hysterectomy, while two were later given radium treatment. Four of the group became pregnant but none of them went to term; the general health in all, however, remained good. As had been frequently pointed out, an important consideration in gynecologic practice is the mental attitude of the patient. Most women are desirous of bearing children or at least they want the satisfaction of knowing that they possess that function, and the surgeon should at all times respect that wish. The most miserable woman is the one who believes that she has been wrongfully deprived of bearing children or at least has not been given the chance to bear them. This fact was demonstrated in every instance when a second operation or treatment was necessary after a former conservative operation.

MORTALITY

There were ten deaths or a mortality of 2.7 per cent, among those operated upon during the first five-year period. Four or five of these

deaths could possibly have been avoided had no operation been performed. The percentage of deaths in this group is higher than in the second five-year series, when radium was largely used, and we believe that the first period mortality would have been much less had the treatment been nonoperative. In the second five-year group the mortality in 747 fibroid cases treated by operation or irradiation was ten deaths, or 1.6 per cent, but in the operative group the mortality was 2.3 per cent. Only one death followed radium treatment, occurring in a patient who had myocarditis and nephritis of such a pronounced type that in all probability the radium treatment was not a factor in causing death.

TABLE III
TYPE OF OPERATION OR TREATMENT 1920 TO 1925

	1920	1921	1922	1923	1924	TOTAL
Hysterectomy (Supravaginal)	75	96	51	83	79	384
Myomectomy (Abdominal)	18	25	11	17	16	87
Resection of Uterus	2	2	0	0	0	4
Hysterectomy (Vaginal)	1	2	0	1	0	4
Myomectomy (Vaginal)	10	7	9	12	12	50
Myomectomy & Radium	0	7	4	5	5	21
Radium	15	33	41	53	55	197
Mortality	3	1	2	2	4	12
Observation cases	12	11	7	14	9	53

In this second five-year period (Table III), it is shown that our ratio of myomectomies to hysterectomies is practically the same as in the first group; namely, about one to five. In this second group 197, or 26 per cent of all cases were treated with radium, and 21, or 2.8 per cent were treated by myomectomy and radium.

Although a certain percentage of fibroid uteri treated with radium have later become pregnant, yet we are of the opinion that unless definitely contraindicated, myomectomy is preferable in a woman who desires to bear children. This is particularly true in tumors of the interstitial or subperitoneal variety. Unless radium is used in sufficiently large dosage to cause a shrinkage of the tumor with the incidental blood vessel contraction and atrophy of the ovaries, no definite result is obtained; and when it is used to produce these results, the childbearing function is lost. The patient should be told very definitely that radium as generally employed deprives her of future pregnancy and may likewise produce menopause. It is admitted that smaller doses of radium frequently produce excellent conservative results but in view of the fact that there is no known method of estimating the radium resistance or susceptibility in different individuals, we must be most careful in our prognosis. In the myopathic hemorrhages in young women that do not respond to endocrine medication and hygiene, small doses of radium (150 to 250 mg. hours) have a most beneficial curative effect; several of this type, but not included in this study, have subsequently become pregnant.

RELATION OF AGE TO FORM OF TREATMENT

Myomectomy was performed more often in patients between the thirtieth and fortieth year when childbearing and ovarian function are most desirable (Table IV). By contrast, radium was used more often

TABLE IV
RELATION OF AGE TO FORM OF TREATMENT 1920 TO 1925

AGE	MYOMECTOMY	HYSTERECTOMY	RADIUM
20 to 30	22 or 25 %	7 or 2 %	21 or 10 %
30 to 40	51 or 58 %	95 or 24 %	58 or 29 %
40 to 50	13 or 15 %	261 or 67 %	107 or 54 %
over 50	1 or 1.2%	25 or 6.4%	11 or 5.5%

from the fortieth to the fiftieth year when pregnancy is less probable and when the sex function is less likely to be disturbed. It is quite clear, therefore, that the ideal time for radium usage is when the maternal and sexual life is on the wane.

INDICATIONS AND CONTRAINDICATIONS TO RADIUM

In this series we were most careful to make the proper selection of the type of tumor treated by radium and never to use the element in the presence of complications. The contraindications have repeatedly been pointed out by Clark, Norris, Polak, Schmitz, and others and their teaching has been followed in all instances. The indiscriminate use of radium may often give most unfavorable results, and it has been our rule that when there existed doubt of the advisability of using it in any instance, operation was the procedure adopted.

In the group treated by radium we observed the following indications:

1. In small growths at any age if associated with menorrhagia or metrorrhagia.

2. In intramural tumors not larger than a three months' pregnancy and not complicated by inflammation of the adnexa or cellular tissue.

3. In very obese patients in whom abdominal section would entail great risk of mortality or morbidity.

4. In patients having severe physical handicap or constitutional disease.

5. In growths having no suggestion of degeneration or rapid growth.

6. When the patient was acquainted with the possibilities of failure or only temporary improvement and was willing to have repeated treatment or operation.

Four patients in this series, operated on account of pelvic peritonitis complicating the tumor, had been previously treated by radium in other clinics. It was quite evident that on account of the adnexal inflammation, operation rather than irradiation should have been the method of choice in the first place. As a consequence of the radium effects on

the pelvic tissue, the operations were quite difficult. This demonstrates that a most careful differential diagnosis with exclusion of complications is essential and that, unless the physician is thoroughly skilled in pelvic examination, he is not justified in using radium. Carcinoma of the fundus in association with fibroids was found in two patients previously treated elsewhere by radium. Curettement had probably not been performed in either case, which again emphasizes the importance of curettement as a diagnostic measure before introducing radium.

TABLE V
RELATION OF RADIUM DOSAGE TO AGE OF PATIENT

AGE	600 MG. HR.	1200 MG. HR.	1800 MG. HR.	2400 MG. HR.
20 to 30	10	3		
30 to 40	20	43	5	5
40 to 50	12	85	9	10
50 to 60	2	10	4	—

Total number 218

RADIUM DOSAGE IN RELATION TO AGE

Table V shows that small or moderate doses of radium were used more often than larger doses, as compared with the amounts used in many other clinics; but since our follow-up demonstrated that the results were generally satisfactory, we did not feel justified in increasing the dosage. In only fifteen instances was a second application necessary, and several of these were women under forty in whom an effort was made to control the bleeding without establishing the menopause. The average dosage to cause a complete cessation of menstruation with the smaller tumors was 1200 mg. hours, although in a few instances, complete amenorrhea resulted from smaller dosage. The most satisfactory results were obtained in patients of about the forty-fifth year, having an uncomplicated bleeding fibroid not larger than a three months' pregnancy. Such a patient is near the menopause and even though we anticipate that period by a few years no real hardship is entailed. In younger patients, particularly under thirty-five, small

TABLE VI
RADIUM FAILURES, PATIENTS REQUIRING OPERATION LATER

Tumors too large	7
Inflammatory adnexa	6
Necrosis of tumor	2
Recurrence of bleeding	9
Total	24, or 11 per cent

or repeated doses were recommended. In women nearly fifty years of age or over, degenerative changes in fibroids are frequently present, and we were careful to exclude such conditions before applying radium.

Our percentage of what we classify as radium failures may be considered unusually large. In explanation, however, it can be stated that

several of these failures were due, not to the improper action or failure of the radium, but rather to our own poor judgment or ultraconservatism. Particularly was this true in the cases treated where the tumor was too large or the uterine canal too tortuous to admit of the full action of the radium in a uniform manner. In the inflammatory cases we erred in thinking that the inflammatory process had completely subsided and, as happened in two cases, we failed to recognize the pathologic condition on bimanual examination. In the two patients in whom the fibroids became necrotic, it was impossible to determine at the time of treatment that such degenerative change was already taking place. The recurrence of bleeding in nine instances was probably due to insufficient dosage, and in accordance with the wishes of the patients, hysterectomy was performed in preference to a second dose of radium. As all of twenty-four patients recovered from the operation, no serious harm was done by giving radium a trial and this we believe is a perfectly justifiable procedure in very doubtful cases.

TABLE VII

SUMMARY OF ALL CASES OPERATED OR TREATED DURING THE PAST TEN YEARS (NOT INCLUDING THOSE WHO REFUSED OPERATION)

	FIRST FIVE YEARS	SECOND FIVE YEARS
Hysterectomy (abdominal)	263	384
Hysterectomy (vaginal)	14	4
Myomectomy (abdominal)	72	87
Myomectomy (vaginal)	15	29
Radium (1 treatment)	none	177
Radium (2 treatments)	none	20
Mortality (operative)	10 or 2.75%	12 or 2.3%
Radium mortality	—	1 or 0.014%
Observation cases	74	53

Other interesting data found during this survey of our last ten years were as follows:

Sterility existed in 60 per cent of the married women. Bleeding or marked menstrual irregularity was present in 65 per cent. The hemoglobin in more than twenty cases was 40 per cent or less. Blood transfusion was resorted to in only one instance, in all other patients preliminary rest and treatment sufficed to allow of quickly executed operations with no mortality.

Gallstones that were not diagnosed before operation were found in 65 or 8 per cent of the 806 abdominal sections for fibroids, of which 62 were operated by drainage or removal at the same operation. The appendix was removed in 795 or practically all cases, the others having been removed at former operations.

The association of carcinoma of the cervix was found in four cases but these are not included in this study. In only one patient was there a development after eight years of carcinoma of the cervix after supravaginal hysterectomy. Carcinoma of the fundus was discovered in

eleven cases, four of which were not revealed until after the tumor was sectioned, but the remaining seven were diagnosed by curettement. Chorioepithelioma was present in one case but fibrosarcoma in only seven instances. This percentage of sarcoma is small compared with the published statistics from other clinics, many of which report from 3 to 10 per cent. As all of our tumors were carefully examined by highly skilled pathologists, we are inclined to believe that mistakes are frequently made by general pathologists and sarcoma diagnosed when the condition is really one of fibroma.

It is not within the scope of this paper to discuss the relative value of total and subtotal hysterectomy; but briefly it can be stated that when all factors are considered, we favor the subtotal method, and we have performed the complete operation only when the cervix was markedly eroded or diseased. The subsequent development of carcinoma in the remaining cervix in only one case in our series, sustains this contention.

In the observation group, at least six patients developed a distinct cardiac or cardiorenal disease after some years. This may be interpreted as an argument in favor of the removal of all fibroids when diagnosed, as recommended by Dr. R. R. Huggins in his studies in a long series of cases. However, we are not fully convinced that these same patients would not have developed such complications even with early removal of the tumor. In these six instances the tumors were small and caused no symptoms; consequently we did not feel that they were producing any constitutional disturbances and could be treated expectantly.

Hypertension of a marked type was observed in more than twenty cases and operation was postponed or refused on account of the persistent high pressure. We have noted, however, that several of these hypertension patients, while not responding to usual dietetic and hygienic measures, showed a very marked and usually permanent reduction in the tension after the surgical removal of the tumors. This was not true, to the same extent, of those cases treated by radium.

An attempt was made to compare the severity of menopause symptoms following irradiation with that of the normal menopause. So many factors enter into such a study and there is such a marked difference in the nervous make-up of different individuals, that no positive conclusion has been reached, but it is our general belief that the radium menopause is less severe. We again state, however, that in young women of a highly nervous temperament, myomectomy or even hysterectomy with preservation of at least a portion of an ovary is most desirable. No transplantation, operation, or administration of any form of ovarian substance can be considered a substitute for the normal ovarian hormone.

The observation of Dr. J. G. Clark that fibroid tumors with an as-

sociated anemia bordering on cachexia and out of proportion to the actual blood loss, should not be treated but removed by operation, was confirmed in four instances. The ages of these patients were less than forty and bleeding was never profuse, but the blood picture would ordinarily indicate a marked loss of blood. The tumors were generally small and globular and to bimanual palpation did not seem to be complicated. On section, however, they showed beginning necrotic changes, thus producing toxic absorption.

CONCLUSIONS

A comparative study of our two five-year periods in the treatment of fibroids shows that: (1) Our attitude is decidedly conservative in the uncomplicated cases. (2) When any complication exists, we heartily favor operation. (3) When the preservation of the maternal and sex function is desirable, operation by myomectomy or resection is preferable. (4) The most favorable cases for irradiation are the bleeding variety. (5) The handicapped patients with diabetes, tuberculosis, cardiorenal disease, etc., are best treated with radium, at least as a trial. (6) Curettement should be performed as a diagnostic measure in every instance before radium is introduced. (7) In patients younger than forty, radium should be used only with extreme caution in order to avoid causing a premature menopause. (8) Many fibroids may safely be kept under observation and operated only if definite indications arise.

Since using radium and very carefully observing all the contraindications to its use, our records show that during the past five years a fair percentage has been so treated with very satisfactory results. However, we still adhere to the general principle that when in doubt, operation should be the procedure of choice. While no new line of thought has been presented by this study of more than 1200 cases, yet we have endeavored to show that fibroid tumors of the uterus are not to be necessarily relegated to operation, especially the radical form of treatment. At the same time we have shown that operative mortality and morbidity can be very definitely reduced by the judicious employment of radium when used alone or as an adjunct to surgery.

THE SEDIMENTATION TEST IN PELVIC DISEASES OF THE FEMALE*

BY HENRY SCHMITZ, A.M., M.D., AND HERBERT SCHMITZ, B.S.,
CHICAGO, ILLINOIS

THE observation that the suspension stability of the blood changes in various pathologic conditions has led to the investigation of the sedimentation speed of the erythrocytes in infections and tumor formations of the female pelvic organs. It has been recommended as a specific test in the determination of the virulency of the invading bacteria and the time of safe surgical intervention, and also as an aid in the differential diagnosis of inflammatory from noninflammatory tumors. Eighty patients were subjected to the test and 245 determinations of the sedimentation time were made. The results furnish the basis of this report.

If freshly drawn blood diluted with a 5 per cent sterile sodium citrate solution in the proportion of 4 to 1 is placed in a Linzenmeier test tube, then the sedimentation speed of the erythrocytes gives an indication of the suspension stability of the blood. The sedimentation test consists in measuring in minutes the speed for a given distance with which the erythrocytes separate from the blood plasma.

The exact cause of the increase in sedimentation speed is not known. The present-day view is as follows: Changes in the blood plasma are caused by an increase in the globulins which depends either on a parenterally increased ingestion of albumins or on an increase in waste products arising within the host during physiologic and pathologic processes. The increase in globulin causes chemical and physical changes in the blood which decrease the suspension stability. The chemical changes consist in the formation of protective ferments, while the physical changes are probably a derangement of the isoelectric points of the constituents of the blood. If the origin of these changes were known, then the cause of the acceleration of the sedimentation speed of the blood corpuscles could be correctly interpreted.

An acceleration of the sedimentation speed has been observed in physiologic and pathologic conditions. Rothe¹ observed it in pregnancy, menstruation, puerperium, anemia, increased absorption of products of catabolic processes, such as inflammations, wounds, operations, fractures and neoplastic growths. Mikulicz-Radecki² and Risse³ observed an increase in the sedimentation speed in patients with benign and malignant tumors following the administration of roentgen rays and radium, particularly the former.

In the humoral era of medicine the physicians were familiar with the phenomenon of blood sedimentation. Thus, Hewson in 1772, Hunter in 1797, and Herm. Nasse in 1836 wrote extensively on the subject. A great deal of importance was paid to the suspension stability of the blood, for sedimentation was hardly ever observed in healthy persons but regularly noted in inflammatory diseases, such as pneumonia, pleurisy, pulmonary tuberculosis, smallpox, malaria, and gastric fever. It, also, was seen in nephritis, severe anemia, gout and diabetes mellitus. It was of special interest that pregnancy and puerperium were accompanied by changes in the suspension stability of the blood.

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

In 1917, R. Fabraeus¹ published his investigations on the instability of the sedimentation time of the red blood corpuscles, especially in the pregnant woman. This observation naturally interested the gynecologists and obstetricians. Linzenmeier⁵ must be given credit for devising a method which makes the test simple and accurate, and for studying the diagnostic and therapeutic values of the phenomenon. He considers the test a valuable aid in the determination of the virulency of the infection and in diagnosis and treatment. He propounds the following postulates: 1. A sedimentation time of less than thirty minutes is evidence of an acute inflammatory process except in severe intraabdominal bleeding. 2. A sedimentation time of less than one hour indicates the presence of virulent organisms in subacute or chronic adnexitis. 3. A sedimentation time of two hours or more suggests the absence of latent infection. 4. The reaction is of value in the differential diagnosis of inflammatory and noninflammatory tumors of the adnexa. 5. The safe operability of inflammatory diseases of the pelvis especially pyosalpinx and adherent retroflexion of the uterus, and the advisability of intrauterine instrumentation, such as dilatation of the cervical canal, diagnostic and therapeutic curettage, intrauterine insertion of radium, can be determined beforehand. 6. The sedimentation test is of value in the differential diagnosis of extrauterine pregnancy and adnexitis if the symptoms and blood examination are taken in consideration. Molnar,⁶ Schuhmacher and Vogel,⁷ Cardauns,⁸ Clauser,⁹ Geppert,¹⁰ Gueissaz,¹¹ Hildebrandt,¹² Haller,¹³ Silovic,¹⁴ Faltz,¹⁵ Satta Flores,¹⁶ Garcia,¹⁷ Baer and Reis,¹⁸ and Friedlaender¹⁹ corroborate these findings and conclusions.

Cardauns⁸ and Gaifami²⁰ observed that carcinomata always have an accelerated sedimentation time. Mikulicz-Radecki² found that inoperable carcinomata have an accelerated sedimentation time in comparison to operable carcinomata. However, operability cannot be determined with the test. Silovic¹⁴ observed that carcinomata have an accelerated sedimentation time, while noninflammatory diseases, such as myomata and cysts do not show an accelerated sedimentation speed. Faltz¹⁵ claims that the sedimentation time is normal in benign growths and decreased in malignant growths. The degree of acceleration in carcinomata is proportional to the extent of the tumor. Garcia¹⁷ also states that malignant growths show an accelerated reaction in comparison to benign growths. Vorschütz²¹ concludes that a normal sedimentation time favors a diagnosis of myomata uteri, while an accelerated speed may be due to pregnancy or inflammation. Burkhardt-Socin²² states that in the differential diagnosis of myomata and pregnancy a negative sedimentation test is found in myomata.

We may, therefore, add a seventh diagnostic point; namely, the sedimentation test is of value in the differential diagnoses (a) of inflammatory tumors from myomata and cystomata, and (b) of myomata from carcinomata.

However, Buckhardt-Socin²² states that many normal and abnormal conditions evince a marked decrease in the sedimentation time, such as menstruation, pregnancy after the fourth month, lactation, and active tuberculous processes. Cachexia amenorrhea, cardiac insufficiency, and severe cyanosis show a delayed sedimentation time. Voek²³ sets forth that the blood count and the differential white count are more dependable than the sedimentation test in acute purulent infections. Wachholtz²⁴ asserts that the sedimentation test does not possess a specific character. Neumann²⁵ expresses the opinion that the reaction is not of diagnostic importance in the diagnosis of infectious adnexal disease and the differential diagnosis of salpingitis and extrauterine pregnancy on account of the unreliability of the test. He observed marked discrepancies especially in subacute adnexitis where he obtained only 18.37 per cent positive reactions, and in chronic adnexitis where he found 52 per cent normal values. Grisi²⁶ recommends the test solely for the determination of the proper time of safe operation in inflammatory adnexal diseases.

In the Cook County and Mercy Hospital Clinics a great number of patients with inflammatory adnexal diseases are admitted. Many have a history of recurrent attacks or acute exacerbations, seriously interfering with the working capacity and enjoyment of life. The majority of these patients are dependent on

TABLE I
ACUTE INFECTIONS

NO.	DURATION	S. T.	TEMP.	L. C.	POLY.	OP.	CHARACTER OF OPERATION	RECOVERY	REMARKS
2	5 days	220	100.6	16.2	91	No		21 days	
4	2 days	19	102.0	6.95	67	Yes	Salpingectomy	10 days	
							Right Appendectomy		
6	10 days	35	99.6	10.2	69	Yes	Panhysterec-tomy	Stormy	Parametritis
							Appendectomy		
7	14 days	16	99.0	12.1	67	Yes	Panhysterec-tomy	15 days	
9	14 days	12	98.8	8.4	79	Yes	Myomectomy	10 days	+ Myoma
							Replacement		
10	8 days	49	99.2	8.0	72	Yes	Appendectomy	15 days	
							Umbilical		
11	8 days	13	99.8	9.2	80	Yes	Herniotomy	10 days	
							Replacement		
21	2 days	15	102.4	8.5	78	No	Appendectomy	11 days	
26	2 days	75	99.0	13.6	82	Yes	Cautery of cer-vix	13 days	Appendicitis Acuta
							Appendectomy		
29	14 days	24	100.0	11.6	75	Yes	Panhysterec-tomy	10 days	Drain Myo-mata +
40	2 days	40	98.6	14.0	84	Yes	Myomectomy	10 days	+ Myoma
							Appendectomy		
44	4 days	16		8.2	82	Yes	Salpingectomy	10 days	+ Ovarian Cystoma
							Left		
							Oophorectomy		
							Left		
51	8 days	52	99.0	6.1	68	No	Appendectomy		
52	8 days	34	100.0	12.4	86	No			
53	8 days	14	99.4	21.1	74	No			
54	8 days	120	98.8	10.5	76	Yes	Salpingectomy	10 days	+ Pyelitis
							Left		
55	8 days	240	100.2	9.0	84	Yes	Appendectomy	10 days	
							Salpingectomy		
							Right		
56	8 days	33	99.0	8.8	82	Yes	Replacement	10 days	
							Appendectomy		
57	8 days	25	99.8	7.25	82	Yes	Defundation	10 days	
							Appendectomy		
							Resection right	10 days	
							ovary		
							Replacement of		
							Uterus		
59	14 days	50	98.6	5.4	74	No	Appendectomy		
63	14 days	115	98.6	7.65		No			
68	21 days	12	99.6	10.8	70	No		9 days	
69	14 days	8	100.0	10.6	74	No		6 days	
77	4 days	11	103.0	9.0	72	No			
78	5 days	17	101.2	12.0	90	No			
79	14 days	15	99.2	7.6	84	No			

public and private charity, and we deem it an imperative duty to rid these people of these recurrent infections permanently if possible, and to return them to their state in life as soon as possible. The indications for treatment are practically the same as given by Clark and Norris.²⁷ The primary infections are treated medically. The recurrent infections

TABLE II
SUBACUTE INFECTIONS

NO.	DURATION	S. T.	TEMP.	L. C.	POLY.	OP.	CHARACTER OF OPERATION	RECOVERY	REMARKS
8	60 days	240	98.6	8.2	68	Yes	Replacement of Uterus	10 days	
20	30 days	22		8.2	60	Yes	Appendectomy	15 days	
22	30 days	53	99.1	8.1	83	Yes	Replacement of Uterus	9 days	+ Myomata
45	21 days	118	98.8	6.7	79	No	Appendectomy		
47	21 days	16	100.0	9.7	80	No	Panhysterec-tomy		
49	28 days	24	100.0	10.4	74	Yes	Left Salpingo-oophor.	10 days	Drain
50	42 days	24		14.1	82	Yes	Oophorectomy	10 days	+ Myomata
							Left Salpingectomy		
							Right Appendectomy		
60	30 days	55	98.2	3.65	74	No			
67	60 days	23	100.0	12.4	86	Yes	Bilateral Salpingectomy	10 days	
							Rt. oophorec-tomy		
							Appendectomy		
70	42 days	150	98.8	7.4	70	No			

TABLE III
CHRONIC INFECTIONS

NO.	DURATION	S. T.	TEMP.	L. C.	POLY.	OP.	CHARACTER OF OPERATION	RECOVERY	REMARKS
1	5 months	240	98.6	5.6	63	No		2 weeks	
18	12 months	120	98.8	8.6	78	Yes	Panhysterec-tomy	10 days	+ Myomata
							Appendectomy		
19	6 months	105	98.0	7.2	78	Yes	Panhysterec-tomy	10 days	+ Myomata
							Appendectomy		
27	12 months	166	98.6	9.6	85	No		21 days	
35	7 months	180	98.6	5.0	81	Yes	Cautery of cer-vix	10 days	
							Replacement of uterus		
							Appendectomy		
42	6 months	21	98.0	7.7	78	Yes	Exploratory	10 days	Peritonitis + Myomata
58	5 months	196		6.3		Yes	Defundation	10 days	
							L. oophorectomy		
							Appendectomy		
62	5 months	159	98.0	4.9		No			
74	3 years	24	99.0	8.4	50	Yes	Panhysterec-tomy	11 days	
							Appendectomy		

are subjected to radical surgical treatment if accompanied by continued invalidism and loss of working capacity. The blood count and the differential leucocyte count must be normal, and the temperature must have remained normal for one week; during this time at least two bi-manual examinations must have been done.

Should the sedimentation test corroborate the findings of Linzenmeier, then we could add a valuable and simple test to our diagnostic and prognostic means. It would enable us to determine the safe operability of infections of the adnexa. We subjected 80 consecutive cases to the test. They, therefore, presented a variety of pathologic conditions. Blood examinations were performed on all, the temperature was carefully recorded every four hours, and the infected patients were treated according to the indications given above.

Table I includes 26 cases of acute adnexitis; Table II, 11 cases of subacute adnexitis; and Table III, 9 cases of chronic adnexitis. There were 14 cases of myomata uteri; 8 of carcinomata, and 12 with miscellaneous pathologic conditions, viz., postoperative asthenia, 1; normal cases, 4; arrested pulmonary tuberculosis, 2; active pulmonary tuberculosis, 1; malaria, 1; Streptococcus arthritis, 1; ovarian cyst, 1; and follicle cysts, 1. The sedimentation time in the four normal patients averaged 365 minutes.

The sedimentation time (S.T.), the temperature on admission (Temp.), the leucocyte count (L.C.), the percentage of the polynuclear neutrophiles (Poly.), the method of treatment either operative or non-operative, the morbidity following operation (Recovery), and any complications or errors in diagnosis (Remarks) are entered in Tables I, II, and III.

In the acute infections a S.T. of less than thirty minutes was found in 14 cases; 7 were subjected to abdominal operations; recovery in all was uneventful and the patients left the hospital on the tenth to fifteenth day following operation. One patient had an uncomplicated solitary myoma. A S.T. of thirty to sixty minutes was found in 7 cases; 4 were subjected to a laparotomy; 3 had an uneventful recovery, and one developed a pelvic cellulitis which subsided within two weeks. One patient had uncomplicated myomata. A S.T. of more than sixty minutes was found in 5 cases, 3 of which were subjected to abdominal section; they all had uneventful recoveries. One patient had an acute purulent appendicitis.

In the subacute infections a S.T. of less than thirty minutes was obtained in 6 cases; 3 were operated, and recoveries were uneventful. A S.T. of thirty to sixty minutes was obtained in 2 cases; one was operated on and recovery was uneventful. This case was complicated with multiple myomata. A S.T. of more than sixty minutes was seen in 3 cases; one was subjected to operation and had an uneventful recovery.

In the chronic cases the results were: A S.T. of less than thirty minutes was seen in 2 cases with 2 operations and uneventful recoveries. A S.T. of thirty to sixty minutes was not observed. A S.T. of more than sixty minutes was seen in 7 cases, 4 of which were subjected to operation; 2 were complicated with myomata. Recovery was uneventful in each instance.

The results according to the S.T. and the degree of infection are tabulated in Table IV.

TABLE IV

(A) SEDIMENTATION TIME OF LESS THAN THIRTY MINUTES

	NO.	OPERATED	UNEVENTFUL RECOVERY	STORMY RECOVERY
1 Acute	14	7	7	
2 Subacute	6	3	3	
3 Chronic	2	2	2	

(B) SEDIMENTATION TIME FROM THIRTY TO SIXTY MINUTES

1 Acute	7	4	3	1
2 Subacute	2	1	1	
3 Chronic	0			

(C) SEDIMENTATION TIME MORE THAN SIXTY MINUTES

1 Acute	5	3	3	
2 Subacute	3	1	1	
3 Chronic	7	4	4	
S. T. 30 minutes or less—22 cases;	12 operations;	12 uneventful recoveries.		
S. T. 30-60 minutes—9 cases;	5 “	4 uneventful recoveries and 1 stormy recovery.		
S. T. more than 60 minutes—15 cases;	8 “	8 uneventful recoveries.		

There were also 14 cases of myomata and 8 cases of carcinomata. All the myomata were subjected to abdominal hysterectomy. The sedimentation times were: More than sixty minutes, 2 cases; from thirty to sixty minutes, 5 cases; less than thirty minutes, 7 cases. The patients made an uneventful recovery though 6 had extensive and firm adhesions necessitating repair of the sigmoid in 2 cases. The 6 patients with complicated myomata all had a S.T. of less than sixty minutes.

The cases of carcinoma were all inoperable: 2 were in Group II with S.T. of forty-five and fifty-five minutes; 3 were in Group III with S.T. of thirty-six, six and sixty minutes, and 3 were in Group IV with S.T. of fifty-four, twenty-three and fifty-seven minutes.

DISCUSSION

The determination of the sedimentation speed by the sedimentation test shows that of 46 infections 37 were acute and subacute, and 29 of these had a sedimentation time of sixty minutes or less; while in 8 cases the sedimentation time was well above sixty minutes. The average sedimentation time in normal adults was about 360 minutes; in the infectious cases about eighty minutes; in the patients with myomata

about sixty minutes; and in the patients with carcinomata about forty minutes.

The prognostic and diagnostic aspects of the sedimentation test were ascertained first, by determining the time of safe operability by the usual customary methods, i.e., blood analysis and temperature; and secondly, by taking the sedimentation speed on admission and before operation. A comparison of the results shows that 17 patients with infections and 12 patients with myomata were subjected to operation, though they had sedimentation speeds of sixty minutes or less. All had a normal recovery except one patient who developed a pelvic cellulitis, postponing recovery for two weeks.

According to Linzenmeier, Friedlaender, Baer and Reis and others, patients suffering with adnexal infections and having a sedimentation speed of sixty minutes or less should not be subjected to operation, as the invading bacteria are still virulent. Morbidity and even mortality should have resulted from untimely surgical interference. Morbidity, however, was seen in only one instance. Clinical observation and blood analysis are of primary importance in the determination of the time of safe operability in diseases of the female pelvic organs. The sedimentation test cannot supplant them.

The differential diagnosis of inflammatory adnexal tumors and myomata, or of myomata and carcinomata cannot be facilitated by the sedimentation test. Twelve out of fourteen cases of myomata had a sedimentation time of less than sixty minutes and all the eight cases of carcinoma had a sedimentation time of less than sixty minutes. The number of benign and malignant growths subjected to the sedimentation test is small, yet the conclusion must be drawn that the test is probably not of diagnostic importance. Clinical training and clinical observation must remain the methods of correct diagnosis. The sedimentation test could not even corroborate such findings.

The investigations will be continued and the tissues removed during operation submitted to careful bacteriologic tests. An attempt will then be made to correlate the virulency of the invading bacteria with the results of the sedimentation test and the clinical findings.

CONCLUSIONS

1. An acceleration of the sedimentation time of the red blood corpuscles was observed in the majority of cases of inflammatory adnexitis, myomata uteri, and carcinomata.
2. The sedimentation test is not an aid in the determination of the time of safe operability of adnexitides.
3. The constancy and degree of the acceleration of sedimentation speed in myomata and carcinomata is about the same in both conditions. Therefore, the sedimentation test should not be used in the differential

diagnosis of benign and malignant new growths or of inflammatory swellings and myomata.

4. Blood analysis and temperature records give reliable information about the time of safe operability of inflammatory adnexal diseases.

REFERENCES

- ¹Rothe, Ernst: Zentralbl. f. Chir., 1923, 1, 1328.
- ²Mikulicz-Radecki: Arch. f. Gynaek., 1923, cxx, 187.
- ³Risse: Arch. f. Gynaek., 1923, cxx, 181.
- ⁴Fahraeus, R.: Biochem. Ztschr., 1918, lxxxiii, 355.
- ⁵Linzenmeier, G.: Zentralbl. f. Gynäk., 1920, xlv, 816.
- ⁶Molnar, St.: Zentralbl. f. Gynäk., 1923, xlvii, 845.
- ⁷Schuhmacher, P., and Vogel, W.: Arch. f. Gynaek., 1923, cxix, 127.
- ⁸Cardauns, Fr.: Deutsch. med. Wehnschr., 1924, 1, 513.
- ⁹Clauser, F. I.: Ann. di ostet., 1923, xlv, 181-212.
- ¹⁰Geppert, F.: Zentralbl. f. Gynäk., 1923, xlvii, 1292.
- ¹¹Gueissaz, E.: Schweiz. med. Wehnschr., 1923, liii, 1176.
- ¹²Hildebrandt, Otto: Monatsschr. f. Geburtsh. u. Gynäk., 1924, lxxv, 275.
- ¹³Haller, Edw.: Arch. of klin. Chir., 1923, cxxv, 739.
- ¹⁴Silović, Strečko: Liječ. vijesnik. u Zagrebu., 1924, xlv, 83, 146.
- ¹⁵Falta, Béla: Orvosi hetil., 1924, lxxviii, 17.
- ¹⁶Satta Flores, G.: Ann. di ostet., 1924, xlv, 40.
- ¹⁷Garcia, Casal: Siglo méd., 1923, lxxi, 121.
- ¹⁸Baer, Jos. L., and Reis, R. H.: Surg. Gynec. and Obst., 1925, xl, 691.
- ¹⁹Friedlaender, B.: AM. JOUR. OBST. AND GYNEC., 1924, vii, No. 2.
- ²⁰Gaifami, P.: Revue franç. de gynéc. et d'obstét., 1923, xviii, 87.
- ²¹Vorschütz, Jos.: Med. Klin., 1923, xix, 269.
- ²²Burkhardt-Socin, O.: Schweiz. med. Wehnschr., 1924, liv, 693.
- ²³Voek, G.: Deutsch. med. Wehnschr., 1924, 1, 610.
- ²⁴Wachholtz, G.: Med. Klin., 1924, xx, 1249.
- ²⁵Neumann, Otto: Zentralbl. f. Gynäk., 1925, xlix, 354.
- ²⁶Grisi, A.: Ann. di ostet., 1923, xlv, 587.
- ²⁷Clark, John G., and Norris, Chas. C.: Surg., Gynec., and Obst., 1917, xxv, 33.

25 EAST WASHINGTON STREET.

(For discussion see page 409.)

THE DANGER OF MALFORMATION OF FETUS IN ROENTGEN-RAY TREATMENT DURING PREGNANCY*

BY EMIL RIES, M.D., CHICAGO, ILLINOIS

SINCE roentgen rays have been employed with increasing frequency in the diagnosis of pregnancy and in the treatment of pathologic conditions during pregnancy, the question of possible damage to the fetus caused by irradiation has attained considerable interest.

It is rational to group the cases reported according to whether irradiation has been used on the maternal ovary before conception or on the uterus during various stages of pregnancy. This report is concerned with a case of the second group.

Of twenty-one of the reported cases in this group (collected by Zappert¹) eleven showed some sort of damage to the fetus, while ten fetuses were born normal.

The case described here is of special value, since the fetus was born dead and a postmortem examination revealed interesting findings.

The mother, Bertha W., was twenty-four years of age. There is no history of alcoholism, cretinism, or malformations in the family. When a child, at the age of eleven months, she was brought to Dr. R. W. Hardon, to whom I am indebted for his notes on the patient. At that time the child was very poorly nourished and suffered from obstinate constipation. The facial expression was idiotic. The hair covered the forehead to the eyebrows, the tongue protruded and was enormously enlarged and there was great distention of the abdomen. Dr. Hardon began treatment with thyroid extract at that time, later tinctura iodi internally. Ten days after the thyroid treatment was instituted the baby had natural stools. Then the hair on the head all came out and for six weeks the child was entirely bald. Gradually the hair grew again and occupied the normal area. The tongue receded gradually. At fifteen months she began to walk. At the age of six years she was sent to school. At that time she was of about normal height and weight. She went to grammar school until the age of fifteen and got along fairly well, though her speech was at no time perfect.

It is not known when she began to menstruate, but the menses were normal.

In 1920 she married a man with whom she lived six months. As she had neither libido nor voluptas and did not become pregnant, the man left her. On October 5, 1924, she claims to have had a single cohabitation with a man about whose person and ancestry we have no information. The menstruation, which until then had been regular, disappeared after this cohabitation. In November, 1924, she had a copious hemorrhage for which she consulted a dispensary and was treated with hydrastis and ergot. However, the bleeding continued for two months and in January, 1925, she was sent to the x-ray department of the Postgraduate Hospital.

I am indebted to Dr. B. C. Cushway for the record of her roentgen-ray treatments, given on January 29, February 2, 5, 9, and 12. Three treatments were

*Read at a Meeting of the St. Louis Gynecological Society, October, 1925.

¹Quoted by Kraul: *Zentralbl. f. Gynak.*, 1925, No. 35.

given over one field, two over two fields. The fields were six by four inches. The treatments were given at sixteen inches skin distance with 0.25 mm. copper filter. After this treatment, the hemorrhage stopped. She again felt quite well.

May 26, 1925, she was sent to the x-ray department again for diagnosis, and the picture showed a fetus in the uterus. This picture shows no malformation.

July 21, 1925, the membranes ruptured. The woman came to the hospital soon afterward. Labor lasted twenty-four hours at the hospital and terminated spontaneously. The fetus was born dead in head presentation. The placenta was said to have been intact. The woman made a good recovery. She menstruated regularly again and worked, addressing envelopes. Thyroid treatment has to be administered constantly. If she is without it, she suffers from severe mental depression.

The dead fetus was placed in 2 per cent formalin without being opened and was sent to me in this condition in October last. It presented a hydrocephalus 44 cm. in greatest circumference. The right arm consisted of upper arm and part of the hand without any trace of forearm. The hand had three fingers, no thumb. The roentgen-ray examination of the arm showed bone in the three fingers, no trace of forearm and apparently normal humerus. No other bony malformations except extremely thin bones of the calvarium were visible.

The finger nails protruded beyond the finger tips.

In order to decide whether the irradiation during pregnancy had anything to do with the malformation of the fetus these external findings were decided to be insufficient. A more complete examination of the fetus was carried out and gave the following findings:

On opening the skull external and internal hydrocephalus was seen, but the brain was so decomposed and pultaceous that it could not be sectioned. No thyroid gland was found. The thymus extended from the middle of the pericardium almost to the chin.

The cecum with a small appendix was in the left side of the abdomen, and the colon ascendens curved to the right. The entire colon up to the middle of the transverse colon was entirely movable, with a long mesentery attached to the left of the spinal column. The duodenum was enormously distended to the size of the stomach, and was adherent to the upper border of the colon transversum. It was 27 mm. wide on its anterior aspect. The small intestine was normal except that its mesentery joined that of the colon without attachment to the right posterior abdominal wall. The colon was full of meconium up to the cecum. Meconium escaped on pressure from the anus. The duodenum communicated with the jejunum by an extremely fine opening through which only a very fine probe could be passed. The pylorus was open. The gall bladder was located in a deep cleft of the undersurface of the liver, but its entire undersurface could be made visible by separation of the edges of this recessus in the liver.

When the movable colon ascendens was turned upward, the entire right posterior abdominal wall lay bare. The right ovary with its rudimentary tube lay exactly parallel to the spinal column. The entire length of the tube from its fimbriated end to the internal inguinal ring was 3.5 cm. The ovary itself was 20 mm. long and 4 mm. wide. The tube at its upper extremity showed two apparent fimbriated ends; its lower end terminated in a fine thread at the internal inguinal ring from which a very fine whitish cord descended towards the pelvis, but disappeared entirely before reaching the pelvis proper. The left adnexa were seen close to the internal inguinal ring and the ovary was placed at an angle of about 45 degrees to the body axis. It was also 4 mm. wide, but only 8 mm. long and slightly curved with the concavity towards the spinal column. A left tube with a fimbriated end extended about 3 mm. above the upper pole of the ovary, then continued down to the internal ring as a fine thread and from here towards the pelvis as a whitish

filament about 2 mm. wide which terminated under the peritoneum before attaining the pelvis.

There was no uterus and no vagina.—Between the bladder and the rectum there was a slight whitish transverse elevation of the peritoneum of the culdesac, but no lumen could be found in this fold. Rectum and bladder were in contact lower down with only a little connective tissue between. The external genital organs were those of a normal fetus.

The left kidney and ureter were normal. The bladder and urethra were normal. *There was no trace of right ureter or kidney or adrenal gland.*

Microscopic examination was attempted, but, owing to the poor preservation of the specimen, gave little help except to demonstrate primordial ova in the right ovary, but no lumen could be demonstrated in the right tube.

CONCLUSIONS

While there might be some question whether or not the bony malformations had been caused by the roentgen treatment during gestation, there is not likely to be any doubt about the malformations described in the abdomen.

As the fetus was approximately mature and the last radiation treatment was given 159 days before the birth of the fetus, it is evident that such conditions as absence of right adrenal, kidney, and ureter and absence of uterus and vagina must be due to defects of formation antedating the treatment applied when the fetus was about 109 to 121 days old.

I have found no other reports of postmortem examinations of fetus born malformed after roentgen-ray treatment during gestation. For the determination of the connection between roentgen ray and malformation of the fetus further anatomic investigations appear desirable.

30 NORTH MICHIGAN AVENUE.

ON CONTRACTION AND RETRACTION RINGS

BY CLIFFORD WHITE, M.D., LONDON, F.R.C.P. (LOND.), F.R.C.S. (ENG.)
(*Obstetric Physician, University College Hospital and Lecturer on Obstetrics to University College Hospital Medical School, (London); Surgeon, Samaritan Hospital; Late Obstetric Surgeon, Queen Charlotte's Hospital*)

IN the July, 1925, issue of the AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY, Dr. William Michael records four cases of labor where a localized spasm of a portion of the uterus impeded the birth of the child.

In reviewing the literature on the subject of this interesting abnormality of labor, Dr. Michael refers to a paper that I published in 1913 (vide Proc. Roy. Soc. Med., Jan., 1913, pp. 70-85), but criticizes the view that I put forward then. This was, briefly, that the ring that is the cause of delay in labor is of different origin and pathology to that described by Bandl and which is found typically in cases of labor obstructed by some disproportion (as seen, for example, in cases of contracted pelves or transverse presentations). I also pointed out that a contraction ring that impedes the advance of the child is usually found over a depression in the child's outline, for example round the neck. Cases subsequently published have shown that this is a very common place for the ring to be found, possibly because if it were to occur elsewhere it would not cause so much obstruction to delivery and would not be so noticeable clinically. But the point is not one of great importance, except that Bandl's ring resulting from obstructed labor is not necessarily frequently found over a depression in the child's body.

As I stated at the time the paper was read, it was not supposed to be a final summary of the subject, but was brought forward in the hope of causing discussion and drawing attention to a condition which, at that time, had not received much attention in current textbooks. But in view of experience gained since 1913, I still feel that the condition which I referred to as the "contraction" ring must be differentiated from that usually referred to as "Bandl's" ring.

Bandl's ring is found in cases where the uterus has undergone extreme retraction and therefore may be called Bandl's *retraction* ring if a fuller designation is required. In order that extreme retraction may occur it is necessary that there should be some obstruction to the presenting part being expelled. This is typically seen in a neglected shoulder presentation, where the thinned, tense lower uterine segment joins the thickened, retracted upper segment. In such a case the patient looks exhausted, has a rapid pulse and raised temperature. There is the history of a long labor (the exact duration in hours being unim-

portant, as that depends on the parity of the patient and the strength and duration of the pains in the first stage). There is disproportion between the presenting part and the passage, and the uterus is tender and so hard that it is impossible usually to feel much of the outline of the fetus through it. Usually the presenting part is driven down hard into the brim and the child is almost certainly dead, as, owing to the state of the whole uterus, little oxygenated blood can reach the placental site from the maternal blood vessels. Such a condition is seen typically, late in the second stage of labor.

These cases are rare in a large town, but some years ago I met with an extreme degree of retraction in a case of shoulder presentation, and where I found the lower segment so thinned and tense that I realized that any attempt to decapitate would cause the uterus to rupture. I, therefore, opened the abdomen and removed the uterus unopened with the body of the child inside. In this case the whole uterus was dark purple in color, ecchymoses were forming under the peritoneal coat of the uterus and some of the larger branches of the uterine artery and vein on the right side were already thrombosed.

The upper part of the uterus was much thicker than usual and the lower part only three or four millimeters thick. Further, as I touched the lower segment to cut away the uterus, the peritoneal coat cracked, allowing ecchymosed muscle fibers to bulge through.

Thus, I take it, I was able to observe the commencement of the actual process of rupture of the uterus from obstructed labor. The junction of the upper, thickened, retracted portion of that uterus with the thinned, overtense, lower segment, is the retraction ring of Bandl, and occurs in the later stages of labor delayed by mechanical obstruction.

The preceding case should be compared with an early case of obstruction to delivery from what I still prefer to call a "contraction" ring. The following case (hitherto unrecorded) will do for comparison.

Mrs. F., four previous labors without incident, had been in labor some hours on June 5, 1919, when her doctor examined her vaginally and found a mass in the pouch of Douglas. He asked me to see her at 10 A.M. She was removed to a nursing home and at 12 noon I did a cesarean section on account of the tumor. The membranes were still unruptured, but having made the usual incision I failed to deliver the child, and found that the head was retained by a localized contraction round the child's neck. This contraction was marked by a slight paleness in color in its immediate neighborhood, but the uterus above and below it was apparently in exactly the same state as any other uterus where cesarean section is done early in the first stage of labor. The lower segment was neither tense nor thinned, and the upper segment was contracting and retracting in the usual way.

The ring was sufficiently tight to require cutting through before I could deliver the child's head. The child weighed nine and one-half pounds and did well. The tumor proved to be a fibroid and was removed in 1923. I emphasize that the membranes were unruptured, and the patient had not even dilated her cervix half way. Only the presence of the fibroid prevented this case being left without interference. Otherwise it seems probable that the difficulty would not have become

manifest until delay occurred in the second stage, and forceps failed to deliver the head.

I might also refer briefly to the case of a primigravida where a colleague of mine, who has a very large obstetric experience, palpated the ring *per abdomen*, and noted the unusual state of the uterus. He watched the case for some hours, and then asked me to see the patient in consultation. I agreed with his diagnosis and together we did a cesarean section some four hours later. The membranes were still intact, but the ring was present and required incision. Mother and child did well.

To get a correct perspective in these cases it is necessary to compare extreme cases such as those given, in which there is no similarity in the general condition of the patient or baby, neither is there in the state of the upper and lower uterine segments. In other words, the contraction ring which may occur early in the first stage of labor (I have not yet met it in a cesarean section done before labor starts) must be differentiated from Bandl's ring, which occurs as a result of obstructed labor. I will not repeat the difference in the measurements of the uterine wall which are given in my previous paper.

The difficulty in differentiating the two conditions arises when a contraction ring occurs as the result of repeated manipulations performed in attempts to deliver a patient who has some obstruction to delivery, such as a small pelvis. In a case like this, as the manipulations have failed to deliver the patient, she may get obstructed labor from the small pelvis, and it would be very difficult to say exactly what condition was present. Michael's first case (p. 117) may be an example of such an occurrence, as he states that the head was very much molded, and I think that it is such complicated and difficult cases as these that have caused the use of such an expression as the contraction of Bandl's ring.

It is also worthy of note that in the ordinary case of very prolonged labor (from, for example, a flattened pelvis), it is quite usual for several unsuccessful attempts at delivery to be made before the full difficulty of the case is realized, and these ineffectual attempts cause the uterus to become irritable, so that if a further operative procedure is tried immediately the uterus may become firmly contracted. This contraction may continue for some time so that the case is easily mistaken for one of tonic contraction. It differs from true tonic contraction in that the lower segment is not much thinned and in that the uterus can be made to relax by giving it a rest from all interference and by administering morphia.

I had hoped that Dr. Michael would have had more suggestions regarding treatment, which is a most difficult subject. He suggests that the uterus should be explored by introducing the hand in cases of delayed labor so as to diagnose obstruction by a ring early. He quotes

my collected statistics showing that cases treated by laparotomy had a maternal and fetal mortality of 31.5 and 42 per cent respectively. It is only fair to point out that these figures apply to the period before 1913 and that in many instances (e.g., Russell Andrews' and Maxwell's case) abdominal section was only tried after all other methods had been attempted and had failed, and the mother was already in a desperate condition. Everyone will agree that the mortality will be less in cases in which the diagnosis is made early, but if the whole hand is introduced into the uterus to exclude a ring in every case where labor is delayed, it will mean a deep anesthesia in the middle of labor, and a considerable amount of unnecessary manipulation with an increased risk of septic infection.

Exploring the uterus only settles the diagnosis and treatment remains to be considered. In many cases, even if diagnosed early, it is impossible to dilate the ring manually—it could only be done in one of Michael's four cases—yet he condemns cesarean section which, he states, must "give way to more conservative methods." One could wish for more details as to exactly what he advises should be done. The only case that he records as being treated by craniotomy died undelivered, whereas the only one that he records as treated by cesarean section recovered with a living child, and the second laparotomy case died of sepsis and so might have died from septicemia even if delivery had been effected *per vias naturales*.

Any simple method of dealing with the condition would be very welcome, as few things can be more distasteful to an obstetrician than to have to inform a patient and her friends that, owing to an occurrence that no one can foresee or prevent, it is necessary to perform a major operation instead of having a normal delivery. And yet, unless the ring is easily dilatable, cesarean section seems to give the best results.

It must, of course, be obvious that the maternal and fetal mortality in cases treated by cesarean section *done early* should be very low indeed, and in no way comparable to that from cesarean section or cesarean hysterectomy done in cases where the ring has only been found after forceps, craniotomy and attempts at version have failed to deliver the patient. Merely waiting is unsatisfactory. I have watched a patient with a contraction ring, which occurred early in labor, for twenty hours, hoping it would relax and allow progress to be made, but in the end was unwillingly forced to advise cesarean section.

Dr. Michael makes no mention of continuous weight traction as advocated by J. A. Willett, but which would seem useful, especially as the method of weight traction described by him in the treatment of placenta previa (Proc. Roy. Soc. Med., 1925) could be applied to the head of the living child.

TORSION OF THE NORMAL FALLOPIAN TUBE*

BY H. LAURAN DARNER, M.D., ROCHESTER, N. Y.

(From the Gynecological Department of the Johns Hopkins Hospital and the Johns Hopkins Medical School)

TORSION of the fallopian tube, secondary to a primary pathologic lesion of the tube, parovarium or ovary, is not uncommon, but primary torsion of the normal tube is an exceedingly rare condition. The literature of this subject was thoroughly reviewed by Anspach some years ago. In the series of cases which he collected from the literature, there were none similar to the one here reported. Praeger, Cathelin and Bell have written very interesting monographs on the subject, but they too have failed to mention a case of this type. Smith and Butler report a case in a child, age nine, but the entire right adnexa were involved in the torsion and a follicular cyst measuring 3.7 cm. \times 2.1 cm. was found in the right ovary. Davies, Schweitzer, Rogers and Hansen have reported cases in patients varying from fourteen to twenty-one years of age. Anamnesis revealed no history of pregnancy, and in each case the outlet was found to be virginal or nulliparous. Stark reports a case in a virgin forty-six years of age. Michael, McIlroy, Schwarzwaller, Michel, Eunike and Laemmle report cases in patients who have been pregnant. Including the present case, I have been able to find 6 authentic cases of primary torsion of the supposedly normal fallopian tube in patients who had not previously borne children. The present case herein reported was observed in a virgin and there was no pathologic lesion of the tube or adjoining adnexa which might have been the cause of the torsion. The mechanism of the twisting of the tube in this case is exceedingly obscure.

History.—Miss M. E. K., age thirteen years, a schoolgirl, was admitted to the Johns Hopkins Hospital on January 1, 1924. She complained of pain in the right lower quadrant of the abdomen. The child was born at term spontaneously, and her later development was perfectly normal. The family history was negative. Measles had been the only exanthematous disease, and the patient had had acute tonsillitis when nine years of age. There was no history of epidemic parotitis. The onset of the catamenia was in November, 1923. The menstrual flow lasted three days and was normal in amount. There had been a complete amenorrhea since then.

The present illness began suddenly in the late afternoon five days before admission, when the patient had a sudden sharp pain in the right iliac fossa. The mother stated that the patient had been kicked and immediately complained of colicky-like pain throughout the entire lower abdomen. This was relieved by hot applications, but dull aching pain and a sense of discomfort persisted. There was some nausea but no vomiting. The appetite remained fairly good. The bowels were regular and

*Received for publication, November, 1925.

active. Active catharsis at the onset of the present illness did not intensify the symptoms. The patient had been bedfast since the onset. There had been some slight elevation of temperature. The patient was brought to the hospital, because she had been getting progressively worse in spite of treatment.

On physical examination the temperature was 100.6°, pulse 92, and respiration 20. The general physical examination was negative. There was considerable tenderness throughout the entire right lower quadrant. There was no muscle spasm or rigidity and no acute tenderness over McBurney's point. Rovsing's sign was negative. On pelvic examination the hymen was found to be intact. A vaginal examination was not done, but on rectal examination an indefinite putty-like mass, which was quite tender on pressure, could be made out high up in the right fornix.

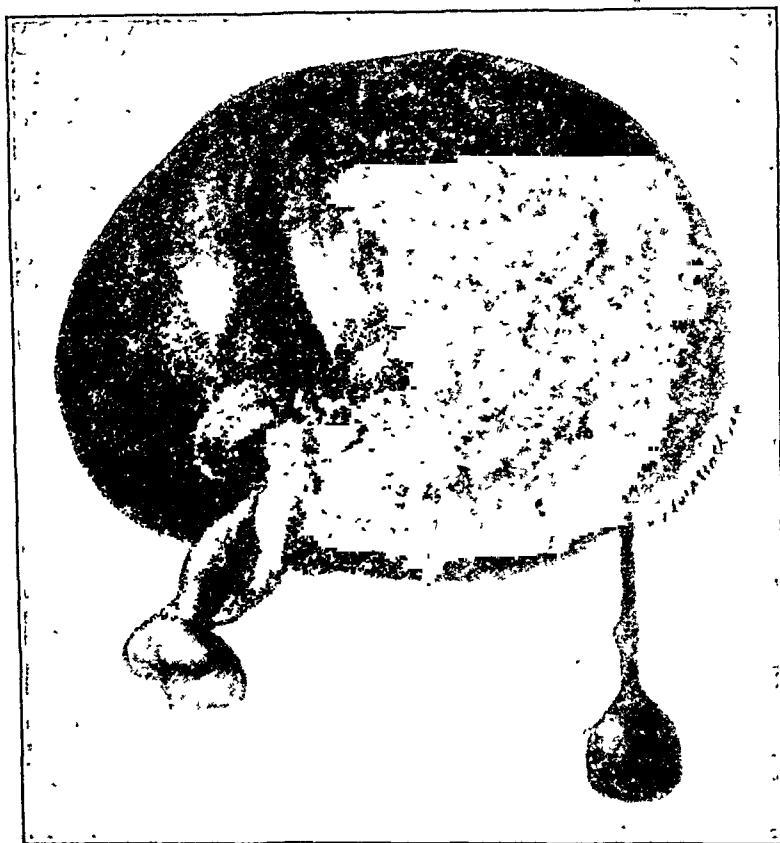


Fig. 1.—Sketch of the specimen made at the time of the operation. Note the three complete turns in the ampullar part of the tube. The fimbriae are tremendously swollen but not adherent. The small cystic mass attached to the tubal mass is a hydatid cyst which is involved in the torsion.

The urine was negative. The leucocyte count was 14,800. The clinical impression was acute appendicitis with an appendix abscess.

Preparations were made immediately to do a laparotomy. Before preparing the patient's abdomen for the operation, a rectal examination was done while the patient was under ether anesthesia. At this time the uterus could be well outlined in normal ante-position and was freely movable. The left ovary could be easily felt. It was almond shaped, firm and freely movable. In the right fornix there was a fairly movable sausage-shaped mass about 7 cm. in diameter. The mass was felt to be some lesion of the right tube or ovary, the exact nature of which could not be determined before operation.

The abdomen was opened through a midline suprapubic incision. There was about 300 c.c. of blood tinged serous fluid in the peritoneal cavity. The appendix

was found to be absolutely normal. The distal third of the right tube was tremendously distended, had a bluish black appearance and the fimbriae were markedly swollen and cyanotic. There were no abnormally long accessory ostia. Attached to the globular tubal mass was a small hydatid cyst which was also extremely cyanotic. The medial and proximal third of the tube had been twisted clockwise three and one-half times. The right ovary was found beneath the tubal mass. It was perfectly normal in size, shape and appearance, and its pedicle had not been distorted. The right infundibulopelvic ligament was not elongated or distorted, and there were no varices in either broad ligament region. The left adnexa and the uterus were perfectly normal. No recently ruptured follicles were noted in either ovary. (See Fig. 1.) The fallopian tube was removed, along with a wedge of the uterine cornu, bleeding being controlled with catgut ligatures. A loop of the round ligament was drawn over the uterine cornu. The appendix was removed and the abdomen closed.

Except for a superficial infection at the upper angle of the incision, the patient's convalescence was uneventful. There was a perfectly normal menstrual period beginning on the fifth postoperative day and lasting four days. The patient was discharged on the twenty-first day after operation feeling perfectly well.

The patient has visited the hospital regularly for a year since operation. There has been no recurrence of the preoperative symptoms. The menses have recurred regularly every month since operation, normal in duration and amount. There has been no dysmenorrhea.

Microscopic study of numerous sections of the tubal mass showed the usual findings associated with this condition. The serosa had almost completely disappeared. The muscularis was infiltrated with numerous fresh and old hemorrhages. The veins were markedly dilated and filled with blood. The connective tissue was markedly edematous and infiltrated with extravasated blood. The epithelium also showed considerable edema and marked degeneration. There were numerous subepithelial hemorrhages. The wall of the tube was considerably thinner than normal. The tubal lumen was extremely dilated and filled with fresh and old blood clots. There was no evidence of a recent or old inflammatory lesion of the tube. There were no microscopic findings suggesting a tubal pregnancy or a neoplasm. Microscopic study of numerous sections of the appendix shows no pathologic lesion.

REPORT OF CASES

1. DAVIES' CASE.—Patient, age nineteen, single. Menses began at fourteen years and recurred regularly every six weeks. Present illness began two days after the onset of a normal period with acute pain in the right iliac fossa and vomiting. Temperature subnormal. Pulse 112. Operation revealed a markedly swollen and black right tube. It was twisted clockwise about 1 cm. from the uterine end. The right mesosalpinx was abnormally long as compared with the left side. Both ovaries were normal. Only the right tube was removed. Pathologic study of the right tube revealed nothing unusual. Patient's convalescence was uneventful.

2. SCHWEITZER'S CASE.—Patient, age twenty-one, single. Patient had measles, tonsillitis and whooping cough in childhood. Menses began at fourteen years. They were usually irregular, the interval being very much prolonged. There had been no pregnancies. The onset of the present illness was quite sudden, the patient being awakened at 4:30 A.M. with acute pain in the left iliac fossa. There was considerable backache, dysuria, and moderate pyrexia. A local doctor made a clinical diagnosis of renal calculi and gave the patient some morphia. The symptoms gradually subsided.

One month later there was a second acute attack coincident with the onset of

a menstrual period. The patient was admitted to the hospital with a diagnosis of salpingitis. Physical examination revealed an elastic tumor in the left fornix. The right adnexa were negative.

At operation a torsion of the left tube was found. The omentum was adherent to a bluish black left tubal mass. The mass was also adherent to the pelvis and rectal wall. It was twisted through two complete turns to the left. The left ovary was normal as were the right tube and ovary. The mesosalpinx was markedly elongated. Only the left tube was removed. Patient made an uneventful recovery.

3. ROGER'S CASE.—Patient, age sixteen, admitted to the hospital suffering from acute abdominal pain and vomiting. The attack had commenced twenty-four hours before admission. Patient was menstruating at the time. No constipation. There was tenderness in the right iliac fossa. The lower fibres of both recti muscles were rigid.

At operation, the ampullar part of the right tube was found to be black, swollen and twisted on its mesosalpinx. "The left tube which had also undergone torsion but to a less extent, was congested, but not black, and on this side the twist was undone and the tube left in situ." The right tube and the appendix were removed. Convalescence was uneventful.

4. HANSEN'S CASE.—Patient age fourteen years. Onset 3 days before admission with acute pain in the right abdomen and vomiting. Constipated since onset. Moderate pyrexia, leucocytosis of 30,000. Physical examination showed some resistance in the right lower quadrant from the umbilicus downward. The hymen was intact. Rectal examination was unsatisfactory. Clinical diagnosis was an appendix abscess.

Operation revealed a torsion of the right tube. The right ovary was normal. The left adnexa were quite negative on palpation. The right tube and appendix were removed. During the patient's uneventful convalescence it was ascertained that the present illness began very suddenly at school while she was participating in some rather strenuous physical exercises.

5. STARK'S CASE.—Patient's age forty-six. No pregnancies. Menses had always been regular. There had been frequent attacks of abdominal pain beginning several days after cessation of the menstrual flow. General physical examination was negative. Outlet was virginal. There was a firm rounded mass in the right fornix. At operation the left tube was twisted through three complete turns. The mass on the right side proved to be a dermoid cyst. Microscopic examination of the tube was negative. Patient's convalescence was uneventful.

ETIOLOGY

Torsion of the normal fallopian tube sufficient to cause clinical symptoms is a very rare condition. I have been able to find reports of only 12 authentic cases in the literature. The abstracts of five cases are presented, where the patients had never been pregnant and where the etiologic factors may have been quite analogous to those of the present case. In the other seven cases other etiologic factors must be considered which go beyond the scope of the present paper. On the other hand, torsion of the tube is not uncommon in the case of ovarian cysts with twisted pedicles. It is also quite common in association with various pathologic changes in the tube. Anspach was able to collect ninety-five such cases from the literature. He found it most commonly in tubes

which had been the seat of hydrosalpinx, tubal pregnancy or neoplasms. Only occasionally does one observe inflammatory lesions of the fallopian tube in virgins. In a case such as I here reported, it is quite possible that the patient may have had a vulvovaginitis in infancy which remained quiescent until puberty and then, during an exacerbation, invaded the tubes. Occasionally cases are reported where there has been an inflammatory lesion of the tubes during the course of a systemic infection or, at times, as a complication of an exanthematous disease.

It seems unnecessary to give a detailed description of the topographic anatomy of the normal tube. It will probably suffice to call attention to several points regarding the position of the normal tube and its relation to various adjacent structures. It usually falls posteriorly and medialward to the uterus. There is therefore a twist of some 90 degrees in the normal tube. Both the tube and ovary possess a tremendous amount of mobility so that a definite statement as to the tubes' normal position cannot be made. Any increase in the contents of the lumen of the tube would tend to increase its angulation, as would also any change in the position of the uterus.

Peristaltic motion in the sigmoid, cecum or neighboring loops of ileum would also tend to alter its position. Sudden changes in abdominal pressure as coughing, hiccupping, defecation, etc., or a sudden traumatic injury to the abdomen would tend to alter somewhat the position of the tube. In Hansen's case there is a definite history of the onset following violent physical exertion and in the case here reported, the onset followed a traumatic injury to the abdomen. As the present paper is limited to a discussion of the occurrence of such conditions in patients who have never borne children, the tremendous changes in the position of the tube during pregnancy and the puerperium are merely mentioned as being extremely important etiologic factors in cases occurring in multiparous patients.

It is very difficult to explain clearly the mechanism by which primary torsion of the normal fallopian tube takes place. Payr has made an interesting study of the production of torsion in such cases. He has been able to demonstrate twisting of the pedicle of the spleen and, in the laboratory, twisting of a wooden disc suspended by a series of three rubber tubes, one tube simulating the artery in length, consistency and elasticity, and two simulating the veins. By forcing fluid through these three tubes under a uniform head of pressure the wooden disc was made to rotate. The same result was obtained when the spleen was suspended by its pedicle and fluid forced through artery and veins under a uniform pressure.

The veins of the pedicle of any organ are tortuous and, therefore, longer than the artery. Their walls are thin so that they dilate much more easily than the artery. A partial revolution sufficient to cause slight pressure changes in the pedicle may be insufficient to interfere

with the lumen of the artery but may suffice to compress the thin-walled veins. This brings about dilatation and elongation of the veins, causing them to describe a spiral course about the unchangeable parts of the pedicle; namely, the connective tissue and artery.

There are certain important predisposing anatomic and physiologic factors which may, at times, be sufficient to cause such pressure changes in the blood vessels of the pedicle. The more important factors causing such changes include: abnormal physiologic contractions of the tube, long mesosalpinx, long accessory ostia, hydatids of Morgagni, or changes in length and thickness of the tube, persistence of the fetal tortuosity of the tube, vascular changes, extravasation of menstrual blood into the lumen of the tube, and configuration of the pelvis.

I wish, particularly, to emphasize the importance of the first one of these factors. Corner and his associates have made some very valuable contributions to this phase of the physiology of the tube. They have found that the tube undergoes rhythmic contractions, the amplitude and number of the contractions varying uniformly throughout the various stages of the menstrual cycle. In a personal communication from Guttentmacher he states that the fallopian tube in the pig undergoes very violent and irregular contractions before the period of sexual maturity. Although this matter has not been investigated with the human tube, it is quite likely that similar contractions occur in the latter. It is quite conceivable that abnormal contractions of the tube may so alter the venous pressure as to carry out the mechanism of torsion, as described by Payr.

The presence of a long mesosalpinx, long accessory ostia, hydatids, changes in the length or thickness of the tube, and vascular changes may often be contributory factors. The mesosalpinx is richly vascularized; often there are huge worm-like masses of veins. Although we are not thoroughly familiar with the circulatory changes of the internal pelvic organs during menstruation, it is generally thought that the vascularity of the organs is considerably increased. The fact that torsion of the tube or twisting of the pedicle of an ovarian cyst is especially frequent at about the time of the menstrual period or during pregnancy and the puerperium may depend somewhat upon these vascular changes.

Sampson's interesting work has shown that perhaps there may be a reflux of menstrual blood through the fallopian tubes. It is conceivable that retention of this menstrual blood in the distal third of the tube might cause a bulbous swelling of the tube, sufficient to produce torsion.

Twisting of the pedicle of an ovarian cyst and torsion of the fallopian tube is much more common on the right side. In the six cases here recorded the lesion was noted three times on the right side and twice on the left. In Roger's case it was bilateral, although the torsion

of the left tube was so slight that it was not sacrificed. This may be partly due to the fact that the sigmoid passes over the pelvic brim to the left of the sacral promontory, giving greater roominess to the right side of the pelvis. The alternate filling and emptying of the sigmoid may transmit some motion to the adnexa.

It seems that any of the above factors, or a combination of one or more of them may bring about the phenomena necessary to raise the venous pressure. After this takes place the subsequent events would probably be in accordance with the so-called hemodynamic mechanisms as worked out by Payr.

SYMPTOMATOLOGY

The symptoms resemble very much those of an ovarian cyst with a twisted pedicle. The onset of symptoms may be precipitated by the act of urination, defecation, falls, sudden muscular effort, lifting, stooping, etc. The symptoms of an acute complete torsion usually begin very suddenly with violent and intense pain in the iliac fossa of the involved side. The initial pain may, however, be epigastric, abdominal or pelvic, finally localizing over the site of the torsion. In some cases the pain is constant, dull and aching in character, with frequent exacerbations. In others, it is short, sharp and agonizing, resembling renal colic. Occasionally the onset is so sudden as to cause complete collapse.

If the rotation is slight, or if the position is such as to readily readjust itself, the symptoms may be very mild and recur intermittently for a period of several months or years. The patient, in these cases, is usually relieved by palliative treatment until the occurrence of complete strangulation. In Schweitzer's case there was a history of the first attack occurring one month before the attack necessitating operation. Both attacks were about the time of the menstrual period. In Stark's case attacks had been occurring at the time of the menstrual periods throughout a long period of time.

Frequently the physician is not called to see the patient until after the onset of reflex phenomena. Soon after complete torsion there is a blood-tinged exudate which is sufficiently irritating to the parietal peritoneum to give symptoms of an acute localized or general peritonitis. By this time there is usually nausea and vomiting. Anspach observed vomiting at the onset in 80 per cent of the cases which he collected. Occasionally, there may be initial nausea, with vomiting occurring later, or perhaps not at all. In those cases where there is an irritative peritoneal exudate there is usually intractable distention. Constipation is often so obstinate as to suggest intestinal obstruction.

Reflex urinary disturbances such as frequency, dysuria and retention are not uncommon. In young individuals, particularly, the onset is often with abdominal crises followed by various urinary disturbances.

After the inauguration of the menstrual function there may be vari-

ous menstrual irregularities. The relation of the onset of symptoms to the menstrual flow has been frequently stressed.

At the onset of the attack there is usually a moderate tachycardia with no fever. Sooner or later there is some elevation of temperature. A very important diagnostic point is that the violent clinical symptoms are usually out of proportion to the slight degree of fever and the moderately accelerated pulse rate. The symptoms may be severe enough to cause collapse. Occasionally such symptoms may be due to intra-abdominal hemorrhage.

DIAGNOSIS

The clinical diagnosis will probably be most often confused with the following conditions: ovarian cyst with a twisted pedicle, rupture of a corpus luteum hematoma, appendicitis, pyelitis, biliary or renal colic, perforation of the intestine, intestinal obstruction, or salpingitis.

Ovarian cyst may occur at any age. Gardner, in going over our records, has found 37 cysts, having a diameter of 10 cm. or more, in patients below the age of twenty. This amounts to about 6 per cent of the total number of cysts of this size or larger occurring in the gynecologic patients of this hospital. An ovarian cyst, of course, would not simulate this condition unless there was a twisting of its pedicle. Smith and Butler, in a recent paper, have found 25 instances of ovarian tumors with twisted pedicles before puberty. Recently a postmortem on a full term stillborn child in this hospital revealed an ovarian cyst, about 10 cm. in diameter, with a twisted pedicle. If the presence of a cyst had been known before the onset of symptoms referable to torsion, a differential diagnosis would not have been difficult. In the absence of such data a diagnosis would be impossible unless the normal ovary could be palpated distinctly, in addition to the tubal mass.

It is generally believed that corpus luteum hematomata are associated with inflammatory lesions of the adnexa. Some bleeding is seen in normal corpora lutea in the stage of vascularization and is of no pathologic significance. At what stage this bleeding ceases to be physiologic and becomes pathologic is difficult to say. It frequently happens that a hematoma ruptures, causing enough intraperitoneal bleeding to give the patient acute abdominal symptoms. Recently there have been three such cases in this hospital in all of which a corpus luteum hematoma of the right ovary ruptured producing acute symptoms, which were clinically interpreted as being caused by an acute appendicitis. It would be extremely difficult to differentiate a condition of this sort from torsion of the normal fallopian tube.

The frequency with which the symptoms simulate a lesion of the appendix makes this mistake in diagnosis a very frequent one. In these cases a rectal examination would probably give the information necessary for a differential diagnosis. In any case where the symptoms of

appendicitis are atypical and one is not quite sure of the diagnosis, three things should be kept in mind: a thorough examination of the base of the right lung, the examination of a catheterized specimen of the urine, and a thorough rectal examination. In a young individual a bedside rectal examination may be quite unsatisfactory, but often a rectal examination after the induction of anesthesia may give the operator data sufficient for an accurate diagnosis.

COMPLICATIONS

If the condition is neglected, the tube may readjust itself and the acute symptoms rapidly subside. It may, however, go on to rupture, causing a hemoperitoneum, with symptoms of an acute secondary anemia. There is always danger of necrosis and gangrene of the tube, followed by secondary infection and the possibility of a general peritonitis. The tube may become the site of a hematosalpinx, which, if it becomes adherent to the neighboring viscera, may cause vague gastrointestinal or urinary symptoms. The entire mass may organize and, as a cystic or a fibrous mass, be discovered only after a long period, during the course of a laparotomy for some other condition. The fever, leucocytosis and occasional presence of albuminuria no doubt result from the absorption of toxins from the necrotic tube. The frequent occurrence of attacks which spontaneously subside, only to recur relatively near or during the next menstrual period, leads one to assume that the vascular changes associated with menstruation are a distinct contributing factor.

Another important and interesting complication occasionally met with in torsion of ovarian cysts, i.e., the involvement of neighboring organs in the twists, has never been recorded in relation with a torsion of the tube, but it is quite possible that such complication could occur.

TREATMENT

An absolute diagnosis of this condition is almost impossible. The treatment is surgical, preferably through a midline incision. Most operators would undoubtedly explore the right lower quadrant through a McBurney incision. With a poorly developed patient or one whose abdominal muscles are atrophic, the internal genitalia can be fairly well explored digitably through a McBurney incision but thorough exploration of the internal genitalia, particularly the left adnexa in a young individual, cannot be made satisfactorily. It cannot, therefore, be too thoroughly stressed that, in obscure cases with symptoms and physical signs referable to a supposed surgical condition of the lower abdomen, a thorough pelvic examination should be made after the induction of anesthesia. We have always made it a rule to examine all gynecologic patients after the induction of anesthesia and have corrected numerous errors in clinical diagnosis which called for therapy quite different from that suggested by the incorrect clinical diagnosis. Where the hymen is

unruptured we have made it an invariable rule to make a pelvic examination per rectum. This examination frequently will not give the correct diagnosis, but it undoubtedly will present data which will suggest the diagnosis, and, most important of all, will indicate proper surgical handling of the patient's condition. Another very important observation is that the contributory etiologic factors may be bilateral. Rogers actually records a bilateral torsion which on the left side was of such a short duration as to make the preservation of the tube possible. It is, therefore, very important that the adnexa of the side opposite to the lesion be very thoroughly examined for any abnormalities and that some plastic operation be done to correct or relieve them. Usually the patient's symptoms are so acute as to require immediate surgical interference. In cases of long standing when the gangrenous tube has become infected, drainage *per vaginam* may be necessary. Other complications must be taken care of as they arise.

CONCLUSIONS

Torsion of the normal fallopian tube is exceedingly rare, there being but six authentic cases recorded in the literature. There are those who would question whether or not torsion of a normal fallopian tube is possible. It is possible that the tubes may be involved during the course of an acute infection, an exanthematous disease, or occasionally during a vulvovaginitis. Whether torsion of the supposedly normal tube is associated with or follows an exacerbation of such an infection can only be proved by further investigation. Torsion of the fallopian tube adds another phase to the already very difficult problem of the diagnosis of acute abdominal conditions.

REFERENCES

- Anspach, Brooke M.: Am. Jour. Obst., 1912, lxvi, 553.
 Bell, William B.: Jour. Obst. and Gynec., Brit. Emp., 1904, v, 514.
 Cathelin, Fernand.: Rev. de chir., 1901, xxiii, 253.
 Corner, George W.: Am. Jour. Anat., 1923, xxxii, 345.
 Davies, D. J.: Brit. Med. Jour., 1925, i, 657.
 Eunike, K. W.: Zentralbl. f. Gynäk., 1922, xlv, 1484.
 Hansen, A.: Zentralbl. f. Gynäk., 1922, xlv, 707.
 Laemmle, Kurt: Zentralbl. f. Gynäk., 1923, xlvii, 436.
 McIlroy: Jour. Obst. and Gynec., Brit. Emp., 1910, xviii, 368.
 Michael, P. R.: Nederl. Tijdschr. v. Geneesk., 1924, ii, 2828.
 Michel, Benno.: Zentralbl. f. Gynäk., 1922, xlv, 905.
 Payr, Erwin: Deutsch. Ztschr. f. Chir., 1906, lxxxv, 392.
 Praeger, J.: Arch. f. Gynäk., 1899, lviii, 579.
 Rogers, Lambert: Brit. Med. Jour., 1925, i, 778.
 Schwarzwaller, A.: Zentralbl. f. Gynäk., 1924, xlviii, 2287.
 Schweitzer, Bernhard: Zentralbl. f. Gynäk., 1918, xlii, 25.
 Smith, Richard R. and Butler, William V.: AM. JOUR. OBST. AND GYNEC., 1921, ii, 507.
 Stark: Jour. Obst. and Gynec., Brit. Empire, 1911, xix, 258.

CHANCRE OF THE CERVIX, WITH A REPORT OF TWO CASES*

BY ROLAND S. CRON, M.D., MILWAUKEE, WIS.

THE history of syphilis of the internal female genitalia dates back to the years 1510-1590, the time of Ambroise Paré. According to Pusey, he first used the vaginal speculum to study and demonstrate vaginal and cervical venereal lesions. It was not until the year 1843, however, that Gosselin and Bennett described the typical hunterian chancre of the vaginal portion of the cervix. The literature since 1905, the year Schaudin discovered the *Spirochete pallida*, has been characterized by a few rich contributions. For the American reader the works of Ivens, 1908, Shillitoe, 1914, Wile and Sinear, 1915, Gellhorn and Ehrenfest, 1916, and Warthin and Noland, 1921, are of the best.

In view of the small number of authentic cases of chancre reported in the literature and the apparent rarity of the lesion, the writer believes that all lesions of this character should be placed on record. In the course of the pelvic examination of some four thousand women, six patients with primary syphilitic lesions of the female genitalia have been seen. Two of these were located on the vaginal portion of the cervix. Judging from these findings the chancre is very rare, but according to other authorities the implantation of the spirochete and the subsequent reaction of the tissue to bring about a hunterian ulcer is much more common in fresh syphilitics. It has been variously estimated that from 1.5 per cent to 4 per cent of all freshly infected luetic women have the lesion on the cervix. The apparent rarity of cervical chancre can probably be accounted for by the lack of symptoms. The chancre readily disappears and leaves practically no scarring, and is frequently overlooked or not recognized during the course of an examination.

The two patients with primary lesions of the cervix are extremely interesting, especially from the point of view of infection and diagnosis:

CASE 1.—A white woman, aged forty-seven years, married, entered the hospital July 5, 1921, complaining of a profuse and foul thick greenish yellow vaginal discharge which started about June 27, without known cause. Subsequent to operation it was learned that the patient had been exposed to a venereal disease. There were symptoms of a beginning menopause. Pelvic examination showed a relaxed outlet, cervix drawn to the left and forward, a retroverted fibromyomatous uterus and cystic ovaries. On introduction of the speculum the cervix fairly "popped" into view and on it were a number of eroded areas, covered with a yellowish foul smelling slough. The largest lesion was on the anterior lip. In view of the history, age and type of lesion a tentative diagnosis of early carcinoma was made. Tissue removed

*Received for publication, October 22, 1925.

showed only chronic inflammation and hyperplasia. The blood Wassermann was negative, but one month later gave a two-plus reaction. Pneumoperitoneal x-ray confirmed the diagnosis of fibromyomata.

Panhysterectomy was performed. The specimen consisted of a fibromyoma uterus and a purplish edematous cervix upon which was an angry looking erosion 1 cm. wide surrounding the external os. Sections from the eroded cervix at this time showed plasma cells, new blood vessels, perivascular infiltration, and *Spirochete pallida* (Warthin-Starry technic).

Wassermann test on the spinal fluid was negative. That on the blood became negative after one injection of arsphenamine. Further antiluetic treatment was administered.

CASE 2.—Patient white, aged twenty-one years, single and a student. The menses were normal except for absence following exposures to conception. They were reestablished each time by internal medication. She sought consultation because her fiancé, who accompanied her, developed a urethral discharge four or five days following intercourse. Questioning of the patient revealed the fact that she had had illicit relations with a second student three days previous to that with her fiancé. The patient had no symptoms referable to any pelvic pathology.

Examination, including bimanual palpation and visual inspection of the vagina and cervix, was entirely negative. Smears, however, showed large numbers of gram-negative intracellular diplococci. After about three weeks of treatment, consisting of rest in bed, drying of the cervix and vagina, applications of 5 per cent mercurochrome 220 and douching, the gram-negative organisms disappeared. At about this time a small area (the size of a pea) on the anterior lip became reddened. It looked like a papule but soon became eroded and then definitely ulcerated. Fused silver nitrate was applied, but instead of benefiting the condition, the lesion enlarged to 5 cm. by 2 cm. It was now funnel shape, had a hyperemic border and rounded edges. The surface was covered with a putrid yellowish white membrane, which could be wiped off easily and was followed by bleeding. On introduction of the speculum the cervix which was enlarged seemed to jump into view. The characteristic sclerosis or button-like feel of the base of a hunterian lesion could be made out in this case, and it extended into the sacrouterine ligaments. *Spirochete pallida* from the base of the lesion were demonstrated by means of the dark-field microscope.

Other signs and symptoms, such as a general adenitis, mucous patches, loss of weight, general weakness and a four-plus Wassermann reaction eventually appeared. Under antiluetic treatment, consisting of neoarsphenamine, bichloride douching and mercury rubs, the cervical chancre rapidly faded and the other signs of lues disappeared. The blood Wassermann remained four-plus with a cholesterinized antigen but became negative with an alcoholic one.

Many interesting problems are presented by the study of these two cases. The infectiousness of both gonorrhea and syphilis before symptoms appeared is well illustrated in the case taken from my private records. Here male student No. 1 and the patient had intercourse three days following sexual relations with a prostitute. Neither previously nor at that time did he have any symptoms or signs of a venereal disease. Two days following the meeting of male student No. 1 and the patient, male student No. 2 (fiancé) and the patient had intercourse. Student No. 1 developed a urethral discharge and eventually a hard chancre. The patient, as was pointed out above, contracted both gon-

orrhoea and syphilis, but transmitted only the former to student No. 2. He missed the luetic infection which eventually made its appearance in the patient as a primary lesion of the cervix. Undoubtedly the first two patients had breaks or abrasions of the mucous membrane sufficient to permit the entrance of the spirochete.

The most common location of cervical chancre is about the external os. An explanation offered for this is that the spirochete may be implanted on a former erosion. Furthermore, when the uterus is in its normal position the anterior lip of the cervix is the one which comes into most intimate contact with the male organ and as a result the spirochete is implanted on that area. Rarely is the initial lesion found in the cervical canal. In the private case, the lesion first appeared on the anterior lip. In both patients the ulcer finally involved the entire cervix.

CHARACTERISTICS

Usually the chancre is single, although various writers have seen multiple lesions, generally only one on the cervix and others about the genitalia. The rather extensive involvement of the cervix in the clinic patient suggests the possibility of more than one lesion resulting in a confluence, giving an eccentric polycyclic appearance.

The development of the lesion in the private case is worthy of study. First a macule which suggested a beginning simple erosion; soon a papule which almost immediately became eroded and then showed many of the characteristics of the ephemeral sore. Both lesions had a hyperemic border, were painless and the induration, although not as definite as one finds in chancres on other parts of the body, could be made out in at least one of the cases. The apparent lack of induration in most cases is the result of the natural hardness of the cervix as well as its inaccessibility to palpation. The satellite bubo, so characteristic of the primary lesion, cannot be felt because of the lymphatic drainage to the glands along the pelvic blood vessels, and not until the infection has become generalized do the other lymph glands enlarge.

The ulcer, when advanced, is generally funnel-shaped with a smooth surface and covered by a grayish pseudomembrane, which may have a yellowish tint. Removal of the membrane will show a few hyperemic areas and serum. In this serum one can find the living spirochetes.

The discharge also varies from a small serous in the eroded papule to a profuse seropurulent in those modified by the presence of other organisms in the vagina. This fact was well demonstrated in one of the cases. The foul and profuse leucorrhoea suggested a new growth rather than a granuloma.

The appearance of the lesion can vary markedly. Wile and Sinear described a fungating type, while Oppenheim has divided them into (1) simple erosion, (2) diphtheritic, (3) ulcerated sclerosis, (4) gangrenous type. Rapid development and spontaneous involution are said

to be more striking in cervical chancre than initial lesions elsewhere. As Thirbierge has pointed out, this is undoubtedly due to (a) its location which insures for it freedom from friction and irritation, (b) the relatively higher and more even temperature, (c) the equable state of moisture, by which the surface of the chancre is constantly macerated.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis includes the consideration of the following conditions: simple cervical erosions, chancroid, herpes simplex, tuberculous ulcer, gonorrheal maculae and carcinoma. Depending on the type of lesion, simple erosion and carcinoma are the most difficult to differentiate.

Wile dismisses the problem of differentiating between herpes and chancroid on the one hand and chancre on the other by stating that the ordinary clinical differences apply with the same exactness and directness to chancres when they occur on the cervix as when they occur elsewhere.

Simple cervical erosion presents greater difficulties but can usually be recognized, since it is found in women who complain of a mucopurulent discharge and occasionally of menorrhagia or metrorrhagia. The lesion may occupy one or both lips, is contiguous with the external os, and is never as regular and as definite as the primary sore. It is frequently associated with a follicular degeneration and is typified by its chronicity, while the chancre generally runs a rapid course.

Tuberculous ulcers are exceedingly rare and are characterized by their marked tenderness, irregular shape and undermined edges. Other nodules, tubercles, are found in the neighboring tissues, and tuberculous foci may be located in other parts of the body.

Gonorrheal maculae are less distinctly defined, appearing as bright yellowish red confluent blotches, flat with the surface of the mucosa, although when they become condylomatous, they may be raised. The top, however, is not flat as is the case with the luetic lesion.

Carcinoma presents the most common and most difficult problem in the differential diagnosis of these two conditions. It has frequently happened that a primary chancre has been wrongly diagnosed as cancer. In another case a damage suit was instituted against a dermatologist for having made the diagnosis of chancre when cancer was actually present. Many suggestions have been made in regard to the differential points. The suggestion that syphilitic lesions are found in the young, while cancer is a disease of middle or old age is not a sound one. This was well proved in the case reported of a woman forty-seven years of age with a primary lesion of the cervix. Neither does my experience confirm the opinion that the infiltration of the parametrium, with immobilization of the cervix, is characteristic of cancer, for the induration of the luetic lesion may simulate it very closely.

The final diagnosis rests upon the microscope. Here one may resort either to the demonstration of the *Spirochete pallida* by means of the dark-field or a histologic examination of tissue excised from the lesion. Pitfalls are possible. Spirochetes normally present in the vagina, although easily recognized with experience, may be mistaken for the spirillum of syphilis. Warthin contends that, in the presence of systemic syphilis and cervical carcinoma, the spirochete of syphilis may be found in the menstrual blood and genital secretions, and, accordingly, the demonstration of the spirochete by means of the dark-field might be made from the carcinoma itself. Authorities of international prominence have made a diagnosis of sarcoma or carcinoma in cases of primary sores. In one of the cases reported the picture of a granuloma was entirely overlooked.

The problem of clinically handling a questionable case has been reduced to the following by Gellhorn and Ehrenfest. "The overwhelming majority of cancers presents itself in an inoperable state. If there be the slightest doubt as to the true nature of the disease an attempt with antiluetic treatment should be made. We know that syphilitic lesions respond very promptly to appropriate treatment, and, therefore, not much time would have been wasted even if specific therapy proved to be a failure." Warthin and Noland have concluded their treatise on this subject by stating that the histologic picture is pathognostic. The demonstration of the spirochete in the characteristic tissue lesions is a confirmatory procedure.

CONCLUSIONS

1. The primary lesion of syphilis is frequently found on the cervix. Its apparent rarity is due to the fact that it is frequently overlooked and that it rapidly involutes.

2. Routine visual examination of the cervix, especially in freshly infected syphilitic women will demonstrate a higher percentage of primary lesions.

3. The *Spirochete pallida* may be transmitted by conjugal relations without there being a macroscopic lesion visible on the transmitter.

4. A negative blood Wassermann reaction during the primary stage is generally the case and does not rule out syphilis.

5. The characteristics of the primary lesion on the cervix may vary so widely that a diagnosis can only be established by demonstrating the *Spirochete pallida* with the dark-field microscope, or by the histologic picture of excised tissue from the lesion, and, positively, only by demonstration of the *Spirochete pallida* in the characteristic tissue lesion.

REFERENCES

- Gellhorn and Ehrenfest: *Am. Jour. Obst.*, 1916, lxxiii, 864.
 Gosselin and Bennett: Quoted by Gellhorn and Ehrenfest: *Am. Jour. Obst.*, 1916, lxxiii, 864.

Ivens: Jour. Obst. and Gynec., Brit. Empire, xiii, 273.

Oppenheim: Quoted by Gellhorn and Ehrenfest: Amer. Jour. Obst., 1916, lxxiii, 864.

Pusey: Syphilis as a Modern Problem, Chicago, 1915.

Shillitoe: Power and Murphy's System of Syphilis, i, 226.

Wile and Sinear: Surg., Gynec. and Obst., 1915, xxi, 643.

141 WISCONSIN STREET.

CYSTADENOMA OF THE OVARY, WITH REPORT OF CASES*

BY GEORGE A. MAYER, M.D., F.A.C.S., NEW ORLEANS, LA.

(*Instructor in Obstetrics, Tulane School of Medicine*)

THE ovary, with the enormous proliferating power of its germinal epithelium, the physiologic process of atresia and cyst formation, the monthly congestion, and the secretory power of its epithelial structures, possesses normal forces which, as may well be imagined, are readily transformed from physiologic function to pathologic process. Rightly it may be said that no organ in the body has so great a tendency to tumor formation, and especially to cyst formation, as has the ovary.¹

Different classifications have been proposed for proliferating cysts of the ovary, but so far the subject has not been settled satisfactorily. The present division is into two classes, according to whether the cysts develop from epithelial (parenchymatous) elements, or arise from connective tissue. Of the former class the benign group, or cystadenomata, to which these reported cysts belong, comprises 80 per cent of the new growths of the ovary. All show secretory activity on the part of the epithelial cells which line the glandular structure. They are all essentially multilocular and are composed of many cystic chambers resulting from the proliferation of the epithelial cells which line the original cyst. The daughter cysts then reproduce themselves likewise until innumerable replicas are formed. This may not be evident at first, grossly, but close examination will reveal what has happened, that one or more of the cysts has grown at the expense of the others, compressing the smaller ones, and giving the appearance of a monolocular process.²

Pfannenstiel used the fact that the contents of these tumors vary as the basis for his classification of pseudomucinous and serous cysts. The differentiation is both in the histologic structure and also in the tendency to papillary and malignant proliferation. The pseudomucinous cysts contain a jelly-like material secreted by the epithelial cells which line them, and this gelatinous material is their distinguishing characteristic. The serous cysts, on the other hand, contain a clear serum, usually of a golden-straw color, rich in albumin, but free from pseudomucin. Later, however, pseudomucin may be present, as well as epi-

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, November 19, 1925.

thelial debris, fatty substance, and often much blood from the rupture of the delicate vascular papillae. They possess markedly the faculty of generating new cysts, either within the original cyst or on the outside of it, hence the term proliferating, which is commonly applied to them. This increase in size is persistent, and there is no means of arresting the growth except by laparotomy and excision.

The theories of the origin and exciting causes of cystadenoma center chiefly around wolffian remnants and germinal epithelium, wherein also lies the explanation of the carcinoma which may arise from these growths. There is considerable evidence to confirm the theory that ovarian cysts do arise from germinal epithelium; this was first demonstrated by Waldeyer, and others have confirmed it, notably Goodall.

We have not infrequently encountered ovarian cysts in our service (Charity Hospital, Gynecology II), and have been able to make some interesting observations from our experiences with them. There were twelve cases of cystadenoma in 1825 cases on the entire service, an incidence of not quite 0.007 per cent, as compared with the reported incidence from Martin's clinic of 1.4 per cent. Four of the twelve were of the pseudomucinous type and eight of the serous type.

Unfortunately these growths showed no early subjective symptoms to aid in the diagnosis. The larger tumors, acting mechanically, caused considerable discomfort from rectal and vesical tenesmus. Three of the patients complained of intense backache, seven had a decrease in menstruation, while two had a marked increase; in one case a uterine fibroid was present also. Two of the patients had marked respiratory embarrassment.

The age varied from twenty-three to sixty-one, with the average age thirty-eight. Only one of the twelve was nulliparous the others having borne from one to eight children. An interesting case, which might be mentioned in detail, was one in which the cyst reached above the umbilicus; the patient became pregnant, delivered a living child at full term without incident, and was operated for the cyst three months after delivery. Such cysts are found slightly more frequently in white women than in colored. With one exception all were unilateral; two were adherent to the omentum, two to the intestines, and two to the pelvic walls.

The choice of the anesthetic in operation is important for various reasons, and particularly in view of the age factor. The pressure exerted by the large cysts interferes with the normal function of the abdominal organs and to my mind is largely responsible for the 30 per cent of cardiorenal conditions we found associated with these cysts in our older patients. In the complicated cases a competent anesthetist is a *sine qua non*. Large incisions are necessary in view of the size these tumors attain, the distended bowels are easily expelled through them, and the sudden release of intraabdominal pressure often brings about conditions which require keen and discriminating judgment on the part

of the anesthetist. In these twelve cases ether was used in six, local and gas-oxygen in three, ethylene in one, and spinal and local anesthesia, one in each.

An attempt should always be made to deliver the tumor without rupture or puncture, though this is frequently impossible because of tenseness within the cyst, adhesions, or the friability of the cyst structure. We delivered 50 per cent of these cases successfully in this manner, and in the cases where rupture occurred or puncture had to be done, every precaution was taken to minimize the spill.

The postoperative course is often stormy, though frequently grave complications terminate favorably. In one of these cases, in particular, a marsupialized remnant of cyst in the pelvis and culdesac became infected and the immediate favorable outcome was a surprise to us all. On the other hand, we lost one case through an embolism, which had its origin, I believe, from one of the large ligated veins in the omentum. The patient died suddenly on the eighth day.

CASE 1.—Mrs. T. L., white female, aged forty-eight, was admitted March 29, 1925, in very poor general condition. Peculiar anxious facies particularly notable. Previous history was without incident, menstrual history normal although rather profuse until seven months before admission, since when flow has been scanty but has appeared every fourteen to twenty-one days. Noticed tumor in abdomen three months ago. Rapid growth since, accompanied by loss of weight and decided respiratory embarrassment.

Wassermann strongly positive. Urinalysis showed traces of albumin and hyaline casts. Hemoglobin 70 per cent, red blood cells 3,750,000, white count 10,000.

Operation March 31, 1925. The cyst was larger than a full term pregnant uterus and was composed of many small cysts, ranging in size from a pea to a grapefruit, grouped about a larger cyst of firmer consistency. Attempted delivery resulted in rupture of several of the smaller cysts and spilling of the gelatinous contents, although not in large amounts. Most of the cysts were so thin that the mere movement of the tumor was sufficient to rupture them. The uterus, right tube and right ovary were left in situ.

Convalescence uneventful, although the patient left the hospital against our advice twelve days after operation.

The weight of the tumor, after the rupture of the cysts described, was ten pounds. The large cyst contained a cheesy material in an oily fluid, grossly a dermoid, and nonmalignant. On section the smaller cyst contained the typical gelatinous material already described, and showed tall columnar cells with nucleii near the basement membrane, at the outer end of which was a clear space, whence the pseudomucin originated. There were goblet cells throughout, not ciliated. Section through the large cyst showed several parallel layers of connective tissue, loose in structure. The diagnosis was nonmalignant teratoma, with pseudomucinous cysts. It is interesting to note that these types are associated in 14 per cent of the reported cases.

CASE 2.—Mrs. L. S., white, aged forty-four, was admitted August 28, 1925. General condition good except for embarrassment of respiration. Menstrual history normal until seven months ago, then scant, and associated with dysmenorrhea, which was not previously present. Previous history without incident. Growth in abdomen present for eighteen months, with recent rapid growth, and almost constant, colicky pain in right side. Marked loss of weight in last six months, frequency of urination, palpitation of heart and shortness of breath.

The abdomen measured 28 cm. from the symphysis to the top of the tumor. Associated umbilical hernia present. Vaginal examination gave practically no information of value.

Operation was on August 29, 1925, under local anesthesia (novocaine $\frac{1}{2}$ per cent). An 8-inch incision was made, with excision of the umbilicus and the hernia. Bilateral multilocular cysts were found to be present, and there was a hemorrhagic fluid free in the abdomen. The cysts were so tightly packed into the abdomen that neither could be dislodged, therefore the left was punctured and the contents removed by suction, succeeding cysts being punctured from this one. The growth was adherent to the growth at the splenic flexure. Puncture and aspiration were also necessary on the right. The anesthesia was very successful, and a second injection of morphine permitted closure without any difficulty.

The laboratory reported the growth to be a malignant papilloecystadenoma, and it should be noted that we did not remove the uterus, which is contrary to the advice of most authorities in the presence of this condition.

The patient made an uneventful recovery, and since her discharge has gained in weight and strength. Deep ray therapy has been given as a prophylactic measure.

CASE 3.—Mrs. M. R., white, aged fifty-four, was admitted February 26, 1924, in exceptionally poor general condition and markedly emaciated. Previous history without incident except for an operation two years ago, with removal of a tumor, whose description suggested an ovarian cyst, said by patient to weigh twenty-four pounds. Verification was not possible. Menopause with gradual onset nine years ago. For past six months has had intermittent spotting, and three weeks ago had rather profuse, bloody flow for three days. Since that time a growth had been noticed in the lower abdomen, which had increased rapidly in size and was causing considerable pain.

Physical examination showed a large cystic mass extending nearly to the umbilicus, with a small hernia at the site of the scar of the former laparotomy. Pelvic examination showed this semifluctuant tumor filling the entire pelvis and so tightly wedged as to interfere with defecation.

Operation was March 10, 1924, under local anesthesia supplemented by gas-oxygen. Six inch incision through the former scar. The cystic mass arose from the left ovary and was intimately adherent to the bladder, uterus and bowels. In freeing up these adhesions the cyst was ruptured and a mucoid substance spilled into the abdomen. Careful aspiration was done. Most of the cyst was removed, together with the uterus and right adnexa, and a portion of the cyst growing under the broad ligament and too intimately adherent to the pelvic wall to be excised was marsupialized. The lower two inches of the incision, where this marsupialization was done, was not closed. The patient did well throughout the operation but the prognosis was grave.

The convalescence was surprisingly good. The abdominal packs were changed every two days for a period of a month, being always found well saturated with gelatinous material. Dry heat applied over the wound brought about some closure, but the sac could not be destroyed. Unfortunately radium and deep ray therapy, which the condition obviously demanded, were not available at the time. She was discharged, however, markedly improved in every way.

Patient was readmitted May 25, 1924. The cyst sac had enlarged and pushed out upon the abdominal wall, to the size of a mandarin, and was made up of many small cysts containing gelatinous material. Another attempt was made to destroy the sac, again without full success, though once again the patient responded well to treatment and her general condition was greatly improved. She was re-admitted August 4, 1924 and this time she showed a marked loss of weight and was having fever as a result of an infection in the sac. Mercurochrome, 2 per cent,

was instilled with considerable improvement, and we hoped that the infection might destroy the sac, but unfortunately this did not happen. Since this discharge all trace of the patient has been lost. The pathologic report in this case was papillocystadenoma of the ovary.

I have quoted these three cases, not because they are exceptional, but because they illustrate well the problems which meet us in the handling of such large cysts. Early diagnosis with prompt treatment obviously produces the best results, and to my mind ovariectomy is indicated immediately the growth is discovered. Even when extreme exhaustion or systemic disease is also present, I believe that an exploratory operation is justified.

REFERENCES

- Crossen: Diseases of Women, ed. iv, 1917, St. Louis, C. V. Mosby Co.
 Lynch: Pelvic Neoplasms, Appleton's Obstetric and Gynecologic Monograph, New York, 1922.

WHITNEY BUILDING.

(For discussion see page 421.)

A CRITICAL ANALYSIS OF 250 PRENATAL CHARTS*

BY J. S. HEBERT, M.D., NEW ORLEANS, LA.

I REALIZE that my choice of subject may seem to many of you the repetition of a familiar story, but I feel that sufficient importance has recently been given to prenatal work to assure me that the theme is at least a meritorious one. Its importance is proved by the fact that it was the choice of subject for the chairman's address in the Obstetrical Section of the Southern Medical Association in 1924, and DeLee emphasizes what is indeed a regrettable fact that, while the majority of physicians today realize the importance of the constant supervision of even thoroughly healthy pregnant women, prenatal care, in all its details, has not yet become an established practice with all doctors doing obstetrics, though he adds that the public is slowly waking up to the necessity of such supervision.

Unquestionably there is no field in preventive medicine which offers the prospects of such glittering returns in checking human misery and saving human lives. Ballantyne claims that it is a scientific field still sparsely settled, very vast and intensely alluring. Williams says that one of the few creditable achievements in American obstetrics consists in the development of so-called prenatal care. The term, however, has a wider application than the words imply; we may define it as such supervision and care of the pregnant, parturient and puerperal woman as will enable her to pass through the dangers of pregnancy and labor with the least possible risk, to give birth to a living child, and to be discharged

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, November 19, 1925.

in such a condition that she may be able to suckle it and thus afford it the greatest prospect of attaining maturity, as well as to fulfill her duties as mother and housewife with a minimum amount of invalidism.

Briefly speaking, then, the objects of prenatal care are so to conduct the mother and the baby through pregnancy that both are strong and healthy at the end and ready for the ordeal of labor with every assurance of a successful delivery, a living child, and a prompt recovery of the mother, while the new individual is given a good start towards healthy citizenship. Pregnancy and labor represent the highest function of the female reproductive system and from a biologic point of view should be a normal process. But when we recall the manifold changes which occur in the maternal organism, it is apparent that the borderline between health and disease is less distinctly marked during gestation than at other times. Derangements, so slight as to be of little consequence under ordinary circumstances, may readily be the precursor of pathologic conditions which may seriously threaten the life of the mother or the child, or both.

Mauriceau once said that the normal woman is sick regularly once a month, with one possible exception, and that is when she is sick with a disease which lasts nine months. "*La grossesse est une maladie de neuf mois.*" This is not strictly true. Many women suffer throughout the whole period of their pregnancy, but on the other hand many are perfectly well and some few are even permanently benefited. It must be recognized, however, that pregnancy tests the integrity of each and every organ in the body and that, if any one of them be diseased, the fact will usually be brought out during the course of the gestation period.

Why should not the woman, then, about to perform the highest function of the human race, at the most interesting and, in a large percentage of cases, the most crucial moment of her life, enjoy the greatest benefits that medicine can afford? She should, but statistics prove that she does not. Of every 200 women who become pregnant, at least one dies. Seven per cent of the deaths of women between the ages of twenty and forty years are due to puerperal infection. Conservatively estimated, 25,000 women die every year in this country from the immediate and remote effects of childbirth. Approximately 8,000 die from infection, 5,000 from eclampsia, and 4,000 from hemorrhage. And all these deaths, if not preventable entirely, are at least capable of being greatly reduced.

Again, tuberculosis is first, but childbirth is second in the number of deaths in women from fifteen to forty years of age. One hundred thousand babies die every year in the United States during delivery, and another hundred thousand die in the first four weeks thereafter. Nearly one-third of the blind people in the world have lost the light of day because of the ignorance or the carelessness of attendants during

pregnancy or at delivery. Thousands of women enter our hospitals each year for the repair of injuries acquired during delivery, and others come to our offices seeking relief from disorders caused by child-bearing.

Wherein lies the explanation of these conditions? The standard of obstetric practice must have been low in its essential and fundamental steps in a large percentage of these cases, for statistics have already demonstrated that only one-seventh as many mothers and one-seventh as many babies die in cases which have had prenatal care. For my own part, I believe that the final solution of many complicated obstetric problems will come through fundamental, scientific prenatal studies, and that not until then will we find, side by side and equal in development, medicine, surgery and obstetrics.

Assuming then, that after taking a complete history and making a thorough physical examination we find a patient with no hereditary taints, who is living a regular life and is in fit physical condition, what should be our attitude towards her prenatal care? In the first place, we should encourage her to continue her regular mode of life. And just here, let me say it is of extreme importance that the physician should gain the absolute confidence of his patient. Advise her to pay no attention to the exaggerated stories she is bound to hear, assure her that with modern methods childbirth can be made comparatively easy, and that in cases of unavoidable complications successful delivery can take place under anesthesia. The advent of pregnancy stirs the emotions of the average woman, and if in her early life she has not learned to adjust herself to new conditions, we may expect, at this time, many symptoms of mental and nervous lack of balance, which makes cooperation between the physician and the patient a matter of real moment.

The responsibility of pregnancy is equally divided between the patient and the physician. The patient is responsible for her attitude of mind, including her response to certain popular and erroneous notions concerning maternal impressions; her manner of dress; her diet, with particular reference to any deviations from her normal appetite and digestion; proper exercise and amusements; and careful attention to the excretory organs. These things the physician, after proper advice, must leave to his patient. For his part, he is responsible for a careful general history and complete physical examination, both of which should be secured at the first interview, if possible; the accurate measurement of every pelvis, particularly in primiparae or in multiparae with history of previous abnormal labors; close, continued watch over blood pressure; and complete analysis of the urine at regular intervals, as demanded by the individual case.

I have analyzed the charts upon which this study is based in the light of these principles I have just laid down, outlining to you the instruc-

tions we give our patients on each of these points, and the system we follow in the matters which are our responsibility.

We advise the pregnant woman to lead a quiet life, to avoid mental and emotional as well as physical fatigue and excitement; to read good books and to avoid medical subjects; particularly to absent herself from association with gossiping neighbors who take pleasure in relating the difficulties and dangers of pregnancy and labor. Yet in spite of these instructions at least 10 per cent of our series gave way, more or less, to mental pressure. Two mothers worried that some injury might have been done their offspring as the result of attempted abortions by drugs soon after conception was known to have occurred. Six were afraid that their babies would feel the effects of mild hemorrhages during early gestation. One of this number, I might say, really lost a large amount of blood, evidently an attempted abortion, the symptoms of which persisted for some eight weeks; the child, however, was unaffected in any way. Another woman was afraid to assume the responsibility of rearing another child; I might say that this is rather an unusual fear; in the clinic at Charity Hospital I have repeatedly observed how few women fear the impoverishment caused by one more to feed. In one case pregnancy created a terror which was indefinable and completely ineradicable. Two were unusually disturbed throughout gestation from the memories of previous unfortunate deliveries. Three were concerned over having seen deformed people, fearing that similar deformities would appear in their unborn children. Another woman suffered continual anxiety from the second month of gestation to term, thanks to gossiping neighbors who assured her that because she was not living with her husband she would have a very difficult labor and a weakling for a child. Aside from these definite causes, six others had simple mental and temperamental disturbances, classed as irritability, melancholia and outbursts of temper.

We understand and appreciate that certain changes in the body are necessary results of pregnancy and we know that in a majority of cases these changes actually beautify the figure. Most women, however, do not so regard them, and we read that Roman women had abortions performed so that they need not suffer the disfigurement incidental to childbearing. Today the preservation of figure is still uppermost in the mind of many women, and the popular method of dress, in many cases, reduces rather than favors the desired end. The ordinary corset displaces all the abdominal organs, pushes the uterus down on the pubis, and even forces it into the pelvis. All the pelvic organs are crowded down in their turn and venous congestion results, with its train of dangers, immediate and remote. The growth of the child is interfered with and even deformities may result.

Proper dress, then, is essential, and the main point is to support the uterus from below. As the development of the abdominal tumor tends

to pull the trunk forward, the woman throws her shoulders back and straightens her neck, which naturally balances her figure but at the same time makes a sharp angle in the lower part of her back, giving her the peculiar gait and pose which Shakespeare called "the pride of pregnancy." This attitude is even more exaggerated if high-heeled shoes are worn.

We endeavor to insist upon low-heeled shoes with broad toes, and a properly fitted supporting corset. Yet in this series I found 7 per cent of the women who could tolerate no constriction whatever in the form of corsets and who included both primiparae and multiparae. Forty-five per cent wore the short maternity waist with great comfort. Three cases wore a perfectly fitted abdominal supporter, these being multiparae with large, flabby abdominal muscles. Ten per cent of the women were indifferent, seeming equally comfortable with any type of support or with none at all. Twenty-five per cent wore the type of shoe directed, the others wore low-heeled shoes with narrow toes.

In this connection I might add that 15 per cent used olive oil for massage of the abdominal walls, claiming that it relieved the stiffness of the muscles and prevented or limited the striae. Two per cent of the primiparae showed mild varicose veins, and 11 per cent of the multiparae had well-defined and painful varicosities.

During the first three months of pregnancy the diet should contain a preponderance of sugar and starches; during the next three months it should be balanced between all food constituents; during the last months it should meet the demands of the fetus for foods containing lime, phosphorus and iron. All of our patients adapted themselves satisfactorily to the diet outlined. Twenty per cent complained of nausea only, while 65 per cent had nausea and more or less vomiting until after the third month. Two cases were classed as pernicious vomiting, and, so far as we could differentiate, one was toxic and the other neurotic. One case craved for food for which she had had no previous desire, five craved special foods, in particular oranges and ham.

The observation of body weight was of particular interest to me. In the average case of pregnancy we know that an increase in weight of from eleven to fifteen pounds is due to the fetus, placenta, amniotic fluid, enlargement of the uterus, and possibly the enlargement of the mammary glands. Thirteen pounds I would say was the average increase. A small percentage of these cases gained less than ten pounds, 15 per cent gained from ten to fifteen pounds, and 75 per cent gained from sixteen to thirty pounds. The increase of weight followed the usual standard increase of 1 per cent of body weight per week during the last eight to ten weeks of gestation. The gain, as a rule, was greater in the primiparae than in the multiparae, one gaining forty pounds.

Three cases are of interest. A primipara, twenty-eight years of age, weighed 175 pounds at conception, and delivered a full term nine pound child, her weight being 178 pounds two days before labor. Another primipara, aged thirty, weight 190 pounds at the onset of pregnancy, delivered a 9½ pound female, and weighed the same when leaving home for her labor. The third case, a multipara, weighed 165 to begin with and gained weight up to the seventh month, when she weighed 168½ pounds. From then until her delivery she lost eight pounds, due, I am sure, to poor nourishment as a result of domestic troubles. The first two patients, of their own accord, followed a diet which would meet all ordinary demands, and at no time felt the need of special or more food.

There was no attempt to regulate the size of the child by the Prochownik diet. One case of pronounced salivation persisted throughout the first five months. Heartburn was present in about 95 per cent of the cases in the last four to six weeks of gestation.

Constipation is the usual rule in pregnancy, and, as we know, may lead to serious complications. Sixty-five per cent of these cases reported what I may term normally constipated bowels; 50 per cent stated that pregnancy increased their usual constipation, 40 per cent that it did not change the natural tendency, and 10 per cent reported that their usual constipation was improved. Of the cases which claimed that their bowel function was ordinarily regular, 75 per cent claimed that pregnancy produced constipation, and 24 per cent that it had no influence. One woman reported a marked tendency to diarrhea, and regulation of her diet was necessary for some four months.

Housework and regulated walks as a rule furnish sufficient exercise for pregnant patient, and 90 per cent of this series so reported. About 10 per cent drove automobiles, under certain restrictions, between the fourth and eighth months, there being no ill effects in any case. Seventy-five per cent included picture shows and card playing as amusements, and under normal conditions there is certainly no objection to these. One woman in particular stated that she enjoyed reading good books, having begun this diversion with the idea of influencing the child's intellect.

The full tub bath was used by practically all the patients with no ill effects. Douches during the latter part of gestation were necessary in two instances because of profuse, irritating vaginal discharges. Potassium permanganate, 20 grains to the gallon, was used, and the douches, of tepid water, were taken carefully under low pressure.

Though falling under special heads, the following cases are of interest and may be inserted here:

Mrs. J., twenty-five years of age, para ii, record normal until twenty-sixth week. At midnight, immediately after intercourse, she was seized with violent abdominal cramps, lasting for two hours. For the next two hours the pains were less severe, after which they recurred violently, and I was called to see her. She was evidently in active labor, but I hoped that by the administration of morphine I might check further progress. For the next three hours the pains were lighter and at longer intervals, but at the end of that time the membranes ruptured and a right arm

presented. I immediately had her transferred to the hospital, where I delivered her under general anesthesia by version and extraction. The child lived two hours.

Mrs. R., eighteen years of age about twenty-six weeks pregnant, contrary to positive instructions took an automobile trip of 200 miles. On arrival she was very tired. Two hours later pains began, thirty minutes later the membranes ruptured spontaneously. She was immediately transferred to a hospital and shortly delivered of a female child which lived only an hour.

Complete urinalyses and blood pressure determinations are of course indicated in all cases, and complete blood examinations are frequently needed also. If the data are handled systematically and concentrated on one page, the value of such a sheet is incalculable. In doubtful or possibly special cases, where the determination of pregnancy is of extreme importance, I have found the Maturin or Phloritzin test very helpful. It was used in 9 cases in this series, the reaction being correct in 8 of the number. In justice to the test I should add that negative observations in two other women in whom menstruation had ceased and who were positive they were pregnant were later proved correct.

For more than fifty years it has been known that a transient, alimentary glycosuria, without a corresponding increase in blood sugar, is a frequent occurrence in early pregnancy, and that it can be experimentally produced by the ingestion of large quantities of carbohydrates during this period. I found in one case in this series that I could produce the reaction as late as the sixth month, the percentage fluctuating from 1 to 6 per cent. The laboratory reports included traces of sugar in five instances, $\frac{1}{2}$ to 6 per cent sugar in 29 cases, and sugar in more than one examination in 16 instances.

The importance of urinalyses at regular intervals is evident when we remember that pregnancy is the test of bodily soundness and that the kidney is the point of weakest resistance. Von Leyden, in fact, described what he termed the kidney of pregnancy, which occurs in a large percentage of cases late in pregnancy, and is characterized by the retention of water and salt without increase of the nonprotein blood nitrogen, and mild albuminuria. Fischer states that 50 per cent of pregnant women may have slight occasional albuminuria with a moderate number of hyaline granular casts with white blood corpuscles, and is inclined to attach no importance to this condition, but DeLee claims that such findings are always an indication of some compromise of function of the kidneys; he always regards albumin with suspicion, and when granular and cellular casts are present, the woman is immediately placed under treatment. For many years up to 1924 the Chicago Lying-In Hospital had had no deaths from eclampsia in patients who had received proper prenatal care; in that year, however, two patients who had been rigidly supervised throughout their pregnancy developed convulsions and died in spite of all possible treatment. Eclampsia, therefore, is not a fully preventable disease, but we

may say in the average case that it is, and for this reason we cannot lay too much stress on the importance of checking the kidney function at regular intervals.

In this series a faint trace of albumin was found in 5 per cent of the cases, a marked trace in 8 per cent, and 1 per cent in 2 per cent. In only 6 per cent, however, was albumin found in more than two examinations. In one of the cases, with a clear record to date, 4 per cent was reported present. Microscopic examination, however, showed the specimen swarming with spermatozoa. The patient admitted that there had been intercourse shortly before the specimen was voided, and all subsequent specimens were negative.

Two cases of preeclamptic toxemia were noted, both developing in the last three weeks. In both cases the albumin was never more than 2 per cent, and both patients cleared up under treatment. One case of nephritic toxemia is included, the patient coming under observation when six and one-half months pregnant. The first examination showed 10 per cent albumin with hyaline and coarsely granular casts, and for five weeks the albumin fluctuated from a trace to 12 per cent. The child was born dead at nearly eight months. I would like to note here that Dr. C. Jeff Miller lays particular stress on this type of toxemia as a cause of fetal death in late pregnancy. I was able to keep in touch with this patient for about eight weeks after her delivery, and although her blood pressure had dropped to normal and the casts had disappeared from the urine, albumin from a trace to 1 per cent was still present.

Although we look upon the kidney as being the weakest link in the chain in a large percentage of cases, on the other hand we should not fail to note certain instances of the wonderful stability of this organ. In support of this contention I would call your attention to one case in particular, in which, in spite of a decidedly stormy course, 11 consecutive urinalyses, including the percentage of urea elimination, were identical.

The average pregnant woman shows a low blood pressure, and the slightest deviation from this standard, therefore, should arouse our suspicions. Sixty-five per cent of these cases gave readings of 100 to 110 over 60 to 80 mm. Five per cent were below 100. Twenty-five per cent were from 110 to 120 over 75 to 90 mm. One patient, para iii, started with a pressure of 120, and from the fifth to the eighth month gradually rose to 150, after which she fluctuated between 140 and 150 over 110. All other tests, however, failed to show that this was an indication of a preeclamptic condition, and in spite of the happy outcome in this instance, such cases are hard to classify and unpleasant to handle. The case of nephritic toxemia, to which I have already referred, fluctuated from 140 to 160. About four days before delivery there was a sharp drop both in the blood pressure and in the percentage of albumin, probably corresponding with the death of the fetus in utero.

Both the preeclamptic cases gradually rose from 100 to 120 mm., not a marked increase but sufficient, with their other symptoms, to make the diagnosis very definite.

I realize that I have not presented to you any new or startling facts, and possibly I have overemphasized figures. To me, however, prenatal care is such a vital subject, probably because in my clinic work I see so many tragedies which follow its neglect, that I have taken the risk of burdening you with statistics, both from the patient's and the physician's point of view, in order to stress the importance of seemingly minor matters. The task of keeping 250 such records, with their mass of details, is, I admit, an onerous one, but you will agree with me that to the conscientious physician one life saved from eclampsia will repay him for his self-imposed toil.

1121 MAISON BLANCHE BUILDING.

(For discussion see page 419.)

FULL-TERM EXTRAUTERINE PREGNANCY, WITH REPORT OF THREE CASES*

By LUCIEN A. LEDoux, M.D., NEW ORLEANS, LA.

FULL-TERM extrauterine pregnancy is a subject of unusual interest, not only on account of its comparative infrequency but also because of the varying aspects of its diagnosis and management. My first experience with the condition was in January, 1923, when I encountered a case on my colored obstetric service at Charity Hospital. Since that time, two other cases have been admitted on the same service and together they form the nucleus for some interesting observations.

CASE 1.—B. W., colored female, age twenty-three, multipara. Admitted January 29, 1923. Previous history irrelevant. Last period January 16, 1922, duration ten days; usual duration five days. Patient was nauseated during latter part of February, felt life from middle of May to middle of October. Enlargement of abdomen began in March, and growth was rapid until November, when greatest size was attained. Since then there was a slow decrease in size. In November, after urination, she passed a lump of bloody, flesh-like substance, about the size of her hand, and since that time there was a continuous pinkish discharge, fairly profuse. About two weeks before admission she began to have abdominal pains, usually dull in character, though occasionally sharp, accompanied by severe backache. There were chilly sensations also, hot flushes, some nausea, and one spell of vomiting. At one time the pains were apparently definite labor pains, but these did not continue more than twenty-four hours. The breasts were enlarged and contained milk from March to November.

Physical examination was negative except that the breasts were enlarged and contained colostrum, and that the abdomen was the size and shape of a pregnant woman about at term. This enlargement was of a symmetrical, ovoid character, without rigidity or tender areas. No heart sounds made out, no fetal movements

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, November 19, 1925.

elicited. Vaginal examination showed the os closed and softened, and the entire cervix displaced posteriorly. The fundus was not made out separate from the ovoid mass.

X-ray examination did not confirm the diagnosis of full-term extrauterine pregnancy.

Under ether anesthesia another vaginal examination was made, and a sound introduced, which penetrated the uterine canal for the usual distance, confirming the diagnosis. At this time also the fundus could be made out distinct from the mass. Laparotomy was then done through a median incision. A large, cystic, semisolid mass presented, with the omentum spread fan-shaped over the entire surface in all directions. The lower pole of the mass was free, except on the left. Incision through the placenta, with suctioning of the amniotic fluid, which contained quantities of meconium. The mass was then removed in toto. The tube and ovary on the right were normal, but the left ovary could not be identified. A portion of the left tube had been removed with the mass. After particularly careful hemostasis the abdomen was closed with drainage from the culdesac through the lower angle of the wound. The sac, when opened, contained a dead fetus.

Convalescence was uneventful, the highest temperature being 101 on the third day. Discharged in good condition Feb. 28, 1923.

The pathologic report was to the effect that this was a case of ovarian pregnancy; I am inclined to believe, however, that it was secondary in origin.

CASE 2.—J. P., colored female, age twenty-nine, primipara. Admitted March 10, 1923. Previous history irrelevant. Last period early in July, 1922, exact date not known. Persistent vomiting spells since last August. About a month ago, after purgation, the child was noticed to be very much lower in abdomen, although, according to the patient, the position had been unusually low from the beginning. There were sensations of fullness in lower abdomen present constantly, together with a sense of pressure on the rectum, and such extreme constipation that only castor oil gave results. Headache and backache were also complained of.

Physical examination negative except for enlarged and distended abdomen. Fetal parts made out, the back being quite low down and lying to the left. Vaginal examination showed cervix very high, behind the pubis, soft, but not open. There was a marked bulging of the posterior vaginal wall. Rectal examination showed the fetal head encroaching upon the rectum and the vagina, in the culdesac, as far down as the coccyx.

The diagnosis was evidently a full-term abdominal pregnancy, with viable fetus, the position occipitoposterior and partially incarcerated. X-ray examination showed the pelvis to be amply large enough for the passage of the fetal head, and it was the opinion of the staff that a relaxed uterine wall had permitted the head to sink so low into the pelvis. The possibility of extrauterine pregnancy was considered.

March 10, 1923, on examination, the head was found low in the culdesac and resting on the coccyx. The cervical os was found with great difficulty, and the cervix was pointing upward. Four days later the external os was found two fingers dilated. The next day apparently definite and normal labor began, and when examination, several hours later, disclosed that the perineum was beginning to bulge, the patient was prepared for operative delivery.

Examination under ether anesthesia showed the vertex pushing through the rectovaginal septum, with the cervix high up, anteriorly, behind the pubis and above the bladder, and the internal os persistently closed. These findings seemed to establish the diagnosis of extrauterine pregnancy, and a median incision was therefore made. When the peritoneum was opened a dark brown omentum immediately bulged out, followed by a portion of the transverse colon. The uterus was not visible. When the hand was introduced into the abdomen the fetus was found lying free in the cavity, the membranes having ruptured. The child was somewhat

cyanotic, but cried as soon as delivered. The placenta and membranes, which were bile-stained, were found adherent to the right tube, broad ligament, cecum, and under surface of the liver. The fimbriated end of the right tube was the point of origin of the umbilical cord. The body of the uterus was in about normal position, purplish in color, soft, and about the size of a three months pregnancy. The adnexa were normal except that the tubes were slightly enlarged. Removal of the placenta was deemed too hazardous and it was left in situ, with a firm pack about the base. Usual closure, with drainage at the lower angle of the wound. It should be noted that there was surprisingly little blood lost during this procedure.

Convalescence was smooth until the tenth day after operation. The drain was removed on the fifth day, together with the pack, and the temperature was approximately normal. On the tenth day, however, there was a severe chill with a temperature rise to 103 and a pulse of 120. From that time on a typical septic



Fig. 1.—Case 2. Child from a case of full-term extrauterine pregnancy. Picture taken when child was nearly two years old. Note supernumerary fingers and toes and webbing.

course followed, with all the symptoms of general peritonitis, and death March 31, 1923, 16 days after operation.

A partial autopsy disclosed the abdomen full of straw colored fluid and there was evidence of a moderate general peritonitis. About half of the placenta had become detached and separated by organized blood clot, the remainder was adherent to the fimbriated end of the right tube, the posterior surface of the right broad ligament, and the appendiceal region of the cecum. There was no evidence of the umbilical cord or the membranes.

The child was a male, weight $7\frac{1}{2}$ pounds, and when last heard from was in good condition.

CASE 3.—M. S., colored female, age thirty-seven, primipara, admitted Feb. 20, 1924. Previous history irrelevant. Last period May of the previous year, pregnancy apparently normal until three weeks ago, since which time there has been a slight

bleeding from the vagina. Admitted with diagnosis of probable abdominal pregnancy.

Physical examination negative except for abdominal condition. Fetal parts distinctly made out, with bulk of mass lying in left lower quadrant of the abdomen, and a smaller mass extending to the right, about the height of a 3 months pregnant uterus. The fetal heart was distinctly heard to the left of the umbilicus and below. Vaginal examination showed a hard mass, presumably the head, between the vaginal wall and the symphysis at the normal position of the bladder. The cervix was soft and about one finger dilated. The fundus could not be made out.

Examination under ether confirmed these findings. The mass on the right was identified as probably placenta; it was apparently continuous with the fetal mass on the left. Laparotomy through a 5 inch incision to the left of the umbilicus. Incision of the sac and extraction of the fetus. The presentation was face, one foot was pointing downward towards the pubis, the other was extended upward towards the spleen. The anterior surface of the sac was covered by omentum, the posterior by a thin, fibrous capsule. The placenta was attached partly to the right side of the rectus muscle and to the right tube and broad ligament almost to the right cornu of the uterus. Its removal was obviously too dangerous to be considered, therefore the cord was clamped and cut close to the base and ligated, and immediate closure without drainage was done. It should be noted also that both the large and small intestines were anemic looking and were adherent in several places by an exudate resembling plasma. The patient was removed from the table in good condition.

The fetus was very pale and respiration was infrequent and shallow. In spite of the usual methods of resuscitation there was no improvement, and the child died in about an hour. It was apparently normal in every way except that the nose was flattened, probably from long pressure. Request for autopsy was refused.

The mother did well until late in the afternoon of the day of operation, when her pulse suddenly became rapid and grew progressively weaker. She died within a few hours, apparently from shock due to internal hemorrhage. The abdomen was reopened and found to be filled with blood clots.

The fact that these three cases occurred within two years, stimulated my interest in the subject and I investigated the records of Charity Hospital. Within the period from 1906 through November 1, 1925, 367 cases of extrauterine pregnancy were admitted, of which number 11 were full term, including the cases above reported. All were negro women. The ages ranged from twenty to thirty-eight years, 4 were primiparae and 7 multiparae.

The value of a careful history is apparent. Most of these patients gave a history of apparently normal pregnancy, but in some few instances during the first trimester, symptoms were described which suggested the existence of extrauterine pregnancy. After this time the gestation approximated a normal one, and only at or near term did fresh symptoms recur. In all the cases except those in which living babies were delivered there was a cessation of fetal movements after term. Practically all reported the development of lactation, the passage of blood clots, or the presence of a blood-stained discharge, and severe abdominal pains, in most cases not resembling labor pains.

Physical examination in all instances showed the tumor present, separate from the fundus uteri, which was usually displaced laterally.

The fetal vertex usually encroached upon the culdesac. Abdominal examination showed the tumor to be unusually symmetrical, and the fetal parts quite near the skin surface.

Three cases were reported past term, two being of twelve months duration and one of fifteen months. These cases differed from the others in that the patients all reported intermittent nausea, with or without vomiting, and progressive emaciation.

In seven cases the preoperative diagnosis was correct. At operation most of the feti were found macerated. The placenta was usually located at or near the fimbriated end of the tube or in the culdesac. The uterus was uniformly reported to be the size of a three months pregnancy.

Laparotomy was done in all instances, with the delivery of nine dead and two living feti. In both of the latter instances, it is interesting to note, the mothers died. There was one other maternal death.

From my own three cases and the others whose records I have studied, I would make the following deductions:

1. Diagnosis is not always easy, as is evinced by the fact that only 7 of the 11 cases reported were diagnosed correctly.

2. The x-ray is of no diagnostic value other than furnishing confirmatory evidence that a dead fetus is present.

3. Laparotomy is the only safe method of delivery, particularly in consideration of the management of the placenta and the control of hemorrhage.

4. The prognosis is more favorable in cases in which the fetus is dead, because of the obliteration of the placental circulation.

5. The placental attachment often appears more formidable than it really is.

6. Drainage through the culdesac would seem logical and desirable.

7. Delivery of a living fetus is rare and is attended with grave maternal risk.

REFERENCES

- Walther: Med. Klin., 1920, xvi, 799.
Rosenblatt: Zentralbl. f. Gynäk., 1923, xlvii, 554-63.
Suvansa: Lancet, 1924, i, 648-49.
Tigert: Jour. Tenn. Med. Assn., 1922, xv, 132-35.
Hayd and Potter: AM. JOUR. OBST. AND GYNEC., 1923, v, 601-20.
Craft: Lancet, 1922, ii, p. 380-81.
Leicester: Jour. Obst. and Gynec., Brit. Emp., 1921, xxviii, 295-98.

1109 MAISON BLANCHE BUILDING.

(For discussion see page 420.)

SURGERY, RADIUM AND ROENTGEN RAYS IN THE TREATMENT OF CARCINOMA OF THE CERVIX*

BY HARRY H. BOWING, M.D., ROCHESTER, MINNESOTA

(Section on Radium Therapy, Mayo Clinic)

NEARLY all of our modern literature on irradiation treatment alone for carcinoma of the cervix uteri is based on what may be termed "trial treatments." However, these reports are decidedly encouraging and with our present knowledge of this pathologic process and a better understanding of the therapeutic effects of the rays employed the future results should be far superior to the ones now recorded. As there is a definite and efficient method of combating this neoplastic condition, it is regrettable that most of our cases are seen so late that only palliation can be expected. However, the improvement is surprising in the limited number benefited. All patients accepted for treatment are improved and the criterion for their acceptance is that, all features considered, they have a chance to live at least six or eight weeks, since it requires this much time for the major tissue response to occur.

An early diagnosis is paramount, as good and lasting results can only be expected in the early and possibly the borderline groups. Therefore, every adult female patient complaining of a menstrual disorder, regardless of the character of the discharge, is worthy of our best efforts in diagnosis; this may require the employment of all the recognized methods: (1) bimanual palpation of the vaginal and rectal structures, (2) visual examination of the vaginal cavity, (3) the removal of a specimen for biopsy, and (4) dilatation and curettage; this method is indicated in only a small group.

The procedures which follow demand the most careful, diligent co-operation between the surgeon and the radiotherapist. The extent and grade of the carcinoma must be carefully determined before treatment. The patient must be managed as an individual and not as one receiving 3,000 mg. hours of radium, or the so-called carcinoma dose, lethal dose, and so forth. The dose of radium used in the treatment outlined here is adequately termed the therapeutic or the physiologic dose. The response to treatment varies and the dose cannot be determined beforehand although after a time the number of applications that will prove efficient in a given case can be reasonably predicted. The treatment is applied by the broken or fractional dose method as distinguished from the destructive single dose method, and provides the greatest amount of flexibility or individualization to suit the needs of the patient. A full

*Read at the annual meeting of the Association of Resident and Ex-Resident Physicians of the Mayo Clinic, Rochester, Minnesota, October 19-21, 1925

description of this technic is impossible here. As a rule, the universal silver tube applicator is the one of choice, containing 50 mg. of radium element (sulphate), filtered through the wall of the applicator (0.5 mm. of silver). It is allowed to remain in position from fourteen to twenty hours. The treatments are given about twice a week until the series is complete, which may require from three to six weeks. The applicator is usually placed into the substance of the tumor or the cervical and uterine canal when these can be located. The plan is to employ about a total of 3,000 mg. hours of radium to each 2.5 cm. depth of involved tissue. The radium treatments are outlined and applied as a well-planned surgical procedure with the expectation that the initial total treatment will not need to be repeated. It may be necessary, however, after an interval of from six to eighteen months, to apply cautious treatment to an isolated area of activity in the vaginal tract and thus further arrest the disease. The radium applicator is always inserted with the patient in the knee-chest position. A Sims speculum and a direct light greatly facilitate these therapeutic procedures. This exposure permits visualization of the malignant process and has proved to be a great help in establishing the diagnosis.

Generally the radium treatments are supplemented by roentgen-ray treatments, using the high voltage technic, with copper and aluminum filtration. Four areas are mapped out: one anterior, one posterior, and two lateral areas. One area a day is exposed until all the areas have been treated; the treatment may be repeated after an interval of two months.

In practically all cases, a biopsy specimen, taken at the time of the first application of radium, is graded according to Broders. I am confident that this information has a definite therapeutic value. In cases in which a specimen is not removed, hemorrhage or secondary infection may be looked for as a possible serious complication.

Cases are classified entirely according to the location and extent of the disease. In Group 1 are cases with early or operable lesions in the cervical canal. In Group 2 are included the borderline cases with disease limited to the vaginal face of the cervix. In Group 3 are the inoperable cases. A case is considered inoperable when the disease has extended to the vaginal walls, broad ligaments, pelvic lymph nodes, and so forth, and usually with some degree of fixation. In Group 4 are the recurring cases. One should be reasonably sure the original lesion was operable, and the skill of the operator must be beyond question. Group 5 includes all cases in which the procedure was incomplete and only modified the lesion, such as incomplete operation, one or more applications of the actual cautery, and insufficient radium and so forth. This is designated the modified group. In Group 1, dilatation and curettage are usually necessary to make a definite diagnosis since the disease is beyond the vaginal face of the cervix. Should the material

removed be reported malignant by the pathologist, total abdominal hysterectomy is performed immediately. Radium and roentgen-ray therapy must be considered as a postoperative procedure; its use depends on the findings of the surgeon and the pathologist. Should a tumor of Group 1 or 2 be confined to the superficial tissue of the cervical canal and be entirely removed by the surgeon, the advisability of irradiation as a postoperative procedure is questionable. Should it prove to be a tumor of Group 3 or 4 with involvement of the deeper tissues of the cervical canal, radium and roentgen-ray therapy as a postoperative procedure is indicated. At least two applications of radium to the vaginal stump should be given, using a vaginal applicator of sufficient size to contain the universal silver radium tube, with walls of 1.0 mm. brass and 3.0 mm. hard rubber. The radium is allowed to remain in position for a period of from ten to fourteen hours at each application; this is supplemented by roentgen-ray therapy to the lower abdomen, back, and lateral walls. A careful follow-up should be instituted for a period of from eighteen to twenty-four months.

For Group 2 I recommend three or four cervical applications of radium for periods of from twelve to fourteen hours each, giving about two treatments a week. At the end of the series, from six to eight weeks should elapse to allow the cervix to heal, although in certain cases a few weeks more may be necessary for complete healing. At this time total abdominal hysterectomy should be considered. In a small group of cases so treated, no active carcinoma could be found by the pathologist in the specimens removed. One surgeon volunteered the information that the operation was easily performed; there was but little tissue ooze, and the fascia planes separated easily. But to ensure satisfactory tissue changes, it is necessary that a sufficient interval elapse between the first application and the operation. This is usually in terms of weeks rather than days. As a prophylactic procedure, radium and roentgen-ray therapy should be given as outlined for Group 1 and with the same follow-up observations.

For Group 3 radium and roentgen-ray treatment is given. Owing to the extent of the lesion, regardless of the improvement that may occur, surgical treatment in this group will not improve the end-results. For purposes of radiotherapy, this group should be divided into two classes: one in which the general condition is good and the other in which the general condition has been undermined by the disease. In the first of these well-planned and applied doses of radium, a total of about 3000 mg. hours for each 2.5 cm. depth of involved tissue by the broken dose method, should be given. The Universal silver tube applicator containing 50 mg. of radium element (sulphate) is used for periods of from fourteen to twenty hours each and applied about twice a week. Two or three treatments, employing the vaginal applicator, are also used, supplemented by a course of roentgen-ray treatment as

outlined for Groups 1 and 2. Marked palliation should follow. The rule is that this treatment is never repeated; it is therefore important that the first series of treatments be sufficient. A follow-up course, as for Groups 1 and 2, is also necessary. When the health is undermined, the disease is usually widespread and radium treatment should be given cautiously. A total of from 1500 to 3000 mg. hours is employed, the applicator being inserted into the substance of the tumor or crater. A course of roentgen-ray treatment as previously mentioned should also be given. As a rule, further radium treatments are contraindicated.

Groups 4 and 5 may be considered together. The amount and location of the infiltrating tumors make it impossible to outline a course of treatment. In these, we employ various types of radium applicators such as the Universal-silver tube containing 50 mg. of radium element (sulphate), steel alloy needles, containing from 5 to 10 mg. of radium element (sulphate) each, platinum irridium needles containing 1 mg. of radium element (sulphate), or seeds containing emanation (Radon) less than 1 millicurie each. These are buried into the substance of the tumor about 1 cm. apart, in an attempt to get equal distribution of the energy throughout the tumor. The vaginal package is used to radiate the apparently uninvolved vaginal wall. In Group 4, much depends on the extent of the lesion at the time of treatment, and it is astonishing how much palliation may occur. I can recall patients treated five and six years ago who are apparently well today. In Group 5 the activity can be further arrested by cautious treatments. Roentgen-ray treatment and a careful follow-up course are also indicated for both groups.

SUMMARY

A combination of surgery, radium, and roentgen rays is efficient in combating carcinoma of the cervix uteri. It is to be regretted that so few patients are seen in the early stages of the disease when the maximal response can be expected. Much depends on the first examining physician and he must realize his responsibility. All irregular menstrual phenomena and vaginal discharge, regardless of its character and the age of the patient, demand a most careful examination to determine the cause. Treatment should be decidedly individual as the response of tissue is different in each case. The broken dose permits a very flexible procedure capable of meeting the needs of the patient during the treatment. Close cooperation of all concerned, including the first examining physician, surgeon, pathologist, and radiotherapist, is essential, and it is only through such management that we can hope for good and lasting results.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS

THIRTY-EIGHTH ANNUAL MEETING

HOT SPRINGS, VA., SEPTEMBER 16, 17 AND 18 1925

DR. ASA B. DAVIS OF NEW YORK, PRESIDING

(Continued from February)

DR. GEORGE C. MOSHER, Kansas City, Mo., read a paper on **The Incompatibility of Pregnancy and Fibroids of the Uterus.** (For original article, see p. 334.)

DR. EDWARD A. WEISS, Pittsburgh, Pa., read a paper on **The Treatment of Fibroids of the Uterus,—A Comparative Study of Two Five Year Periods.** (For original article, see p. 343.)

DISCUSSION

DR. EDWARD SPEIDEL, LOUISVILLE, KY.—In the matter of diagnosis of fibroid tumors or those complicated with pregnancy, we now have a positive method. Before the fifth month x-ray with pneumoperitoneum will outline the nodules of the fibroid tumor and the physician can determine whether there is a probability of any of the nodules obstructing labor in the later months of pregnancy. After the fifth month the x-ray will show the outlines of the fetus in the fibroid complicated with pregnancy. All obstetricians have repeatedly conducted labors complicated with fibroid tumors, in which they had made all preparations for a possible hysterectomy, for a forceps delivery and treatment of postpartum hemorrhage, only to find that the patient had perfectly normal labor. It is well known that in many of these cases where the nodules are present at the beginning of labor, that in consequence of the retraction of the cervix and dilatation, they are pushed up out of the way and a very easy delivery results.

In those cases that have to be submitted to cesarean section, I am in favor of not doing a hysterectomy at the time unless degenerative changes are present, for this reason: We no longer see the tremendous fibroids of other days, and in those instances in which a cesarean section is now performed for fibroid tumor complicating a pregnancy, it is reasonable to suppose that the nodule is situated in the lower segment of the uterus. In consequence of the involution that takes place after labor a much simpler operation can be performed at a later date in most instances, removing the nodules in the lower segment of the uterus and preserving the childbearing function of the patient. Usually hysterectomy should not be performed at the same time that cesarean section is done. Furthermore it increases the mortality.

Dr. Mosher used the term one child sterility. It is my conception that that term

always refers to gonorrheal infection from the cervix that occurs from the birth of the child and results in double pyosalpingitis and consequently sterility.

DR. EDWARD J. ILL, NEWARK, N. J.—First, I want to ask what do these gentlemen mean by degeneration? As I understand them, they mean certain forms of involutions of the tumor. For instance, a patient is pregnant and has a fibroid tumor; suddenly she has pain in the abdomen which lasts a few days and then disappears. If the tumor is removed it is found that there is a red discoloration all through the tumor, instead of being of a pearly cast. This is the first stage of a cure of the tumor by nature, because later on if you look at the same tumor it has become of a grayish or slate color, and later on becomes calcareous or else dwindles down to cicatricial tissue. When you speak of it as a malignant degeneration, there is nothing to prove that.

The paper read last year by Frankl in Cleveland refers to that sort of thing. The occasional case of a fibroma becoming sarcomatous is ever present in the mind of the pathologist. Dr. Weiss did not speak of having a recurrence of sarcoma after all these operations. I haven't seen such a recurrence in thirty odd years in all my operations. Twenty-eight per cent of all women after the age of thirty-five have fibroid tumors. Hoffman, the statistician, whose work is preeminent, has gone through all the records of the Johns Hopkins and the Massachusetts General Hospitals for me and he has ferreted out of the autopsy records the number of women that have fibroids over thirty-five years of age. Every fourth woman you meet on the street over thirty-five has fibroid tumors! How many of us have really seen true sarcomas of the uterus developing from fibroids? Concerning pregnancy, I have seen but one tumor that has not retracted from below. Sometimes they do so during the last week of pregnancy.

I want to ask Dr. Mosher what the pathologic condition was in those cases where he did a hysterectomy before the full term of pregnancy?

When radium is used, we must have intelligence as a factor in the patient herself. Some of our foreigners, whose intelligence is of a low degree and who do not understand our language will not be mentally satisfied if radium is used to cure them of their symptoms for they can still palpate the tumor. We have seen most beautiful results but we never use radium except in the intelligent class of patients who understand what you can promise them. Others have to undergo the hysterectomy provided they have symptoms.

I am glad to know that Dr. Weiss has restricted his radium treatment to small sized tumors. Large ones are failures, or as Dr. Clark says, he hates to make the uterus the sarcophagus of the tumor, which is not very unusual.

DR. JAMES E. KING, BUFFALO, N. Y.—I think Dr. Weiss has very well set forth the views of most of us, who have been using radium in fibroid tumors and I did not rise to dissent with him in any particular. I have found a very interesting side to this question of radium treatment for fibroids and that is, as he hinted, the prejudice that exists in the minds of the laity as to its use. Some of the most unfortunate individuals that I have had occasion to come in contact with have been certain patients that have been treated by radium. Not only was the dose so large as to produce premature menopause, but it left uncertainty as to cure in the minds of these patients and made them almost complete mental wrecks. That is most unfortunate. My own experience has also led me to feel that the early dose, especially in the patient of childbearing age, should be very small. I made some mistakes in my early work, but today I would rather give a small dose, perhaps 400 or even 300 hours, with the possibility of a subsequent dose rather than give an overdose that will result in precipitating the menopause.

Another thing we should consider is not only the childbearing possibilities of the woman, but also her marital life. I have found that in these women who have had the menopause brought on by an overdose of radiation—x-ray or radium—

that the atrophy which takes place is extremely marked and in one instance the marital relations have been impossible.

So far as removal of the tumor is concerned, I must say, as Dr. Ill has said, that the patient should thoroughly understand the possibilities of operation or another dose of radium. I don't believe there is any condition in gynecology where one is so hedged about as in the treatment of fibroid tumors. I think the tumor should not be treated simply as a tumor but that all the associated circumstances should be taken into consideration, to make the best possible decision.

DR. ROBERT D. MUSSEY, ROCHESTER, MINN.—Approximately 2 per cent of the patients who come to the Mayo Clinic for treatment of fibroid tumors are pregnant. This number emphasizes the value of the conservative treatment which has been advocated by Dr. Mosher in these cases. I want to heartily endorse what the author has said about the value of myomectomy in certain of these cases and the relatively small per cent in which it is necessary to do a hysterectomy. The facts are that by conservative treatment under careful observation practically all of these patients can be carried through to term; that most of them can be delivered spontaneously or with the use of low or midforceps; and that only in a very few instances is cesarean section necessary.

The respect of the laity toward the medical man is gained by the conservation of childbearing and the menstrual functions. Radium was used in this group in one in five, I believe, and that is indeed conservative.

There is one point to which attention might be called, and Dr. Weiss touched upon this point, namely careful exclusion of any possibility of malignancy before applying radium. While a fibroid tumor rarely develops malignancy there is no question that this may coexist. Quite frequently the bleeding that occurs in the presence of a fibroid tumor may be due to an adenocarcinoma of the uterus and where this bleeding is at all marked a careful curettage and examination of the scrapings under the microscope is of great value before radium is used. Carcinoma may develop—not as a result of radium, but following its use in cases that have not been properly diagnosed.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—In something over thirty years of obstetric work I can remember but one case in which I have had to do an abdominal operation for the obstruction of labor by an incarcerated fibroid. I made one mistake in removing a uterus some years ago, before labor took place and had the chagrin of seeing a premature child, that I believed would not come through, deliver itself after I had laid the uterus on the table. In other words, these cases do take care of themselves. They are subject to circulatory changes, but the more I see of circulatory changes the more I believe that nature is competent to show you the cause of the persistence of hemorrhage or the persistence of temperature and other conditions.

In regard to the second paper, I don't know of anything that has been presented to any society that is going to carry so much weight as this excellent paper of Dr. Weiss'. When you look at 1,200 cases and see an analysis so honest as that, you can't help but be impressed with the fact that it means something, and to the thinking man carries something with it. The whole point about the use of radium versus operation is this: the diagnosis and the type of tumor. Radium will not cure subperitoneal tumors. Radium will do harm to the submucous pedunculated tumors. We have to have a tumor that has a diffuse circulation from the intramural wall to get our best success with radium.

One clinical point, too, is of very great importance, and that is how to handle these cases. We never promise these patients what we will do. We don't know until we have the patient under the anesthesia and have done our preliminary exploration of the uterus whether we can use radium or whether hysterectomy will be necessary; we don't know until the abdomen is opened whether we will do a

myomectomy or a hysterectomy. Patients should be taught to put sufficient trust in you to allow you to make the decision in order to do the best work.

I don't know of anything that makes a woman so happy as to realize that she is not unsexed. We have been doing partial resections of the uterus much more frequently lately, rather than hysterectomy. Ordinarily it is a question of a healthy cervix, but now we do not worry so much about the cervix because we can cure an endocervicitis. We have been resecting the upper portion, leaving as much mucosa as we can and leaving one or both ovaries, and the patients are very happy. One of my friends in New York advised a dilatation and curettage on one of these cases who had only a lower segment.

Radium will cure dysmenorrhea in many of these very marked multiple fibroids without stopping the menstruation and without the necessity of the woman losing her uterus.

I have for a long time been advocating removal of the cervix in hysterectomy on account of the incidence of cancer. The last few years we are trying a new scheme to see how it will work out. We are coming out the cervix with a very sharp knife so that nothing is left but a rim of partial mucosa and before the patient leaves the hospital we leave 50 milligrams of radium in the cervix for sometimes ten hours or so, and are trying to see whether we will get the same incidence of cancer that we found in the previous analysis of our cases.

DR. HENRY SCHMITZ, CHICAGO, ILL.—In connection with Dr. Mosher's paper I wish to cite a case of a colossal myoma of the uterus which grew so rapidly that the patient was desirous of having it removed. The uterus after hysterectomy delivered itself of a twin pregnancy of about ten weeks. The occurrence of twin pregnancy with myomata is rare and therefore I mention this case.

In the application of radium in myomata uteri we should be extremely careful. Each and every case should be a law unto itself. If the myoma causes but the one symptom of bleeding, then the bleeding can be reduced by the application of very small amounts of radium. We should realize that radium does not primarily act upon the ovaries which are about 5 to 6 cm. distant from the cervical canal, but expends its action on the endometrium. If a gynecologic radium carrier is applied to the surface of the skin at a distance of 1 cm., we can expect a superficial burn of the skin after a 90 minutes application with a subsequent scar tissue formation. If radium is applied intrauterine for a few hours only it will probably cause a scar in the anterior and posterior walls of the endometrium about 3 cm. in length and 1 cm. in width, depending upon the length of the radium capsules. Thus a decrease in size of the menstruating and secreting endometrium is caused and a corresponding reduction in the amount of blood lost at the menstrual periods will result. If necessary a second application can be made in five or six months. In this way menstruation can be preserved. I have seen three cases of pregnancy following this technic.

Another point I wish to make is that radium therapy should be controlled by the gynecologist. I feel that in the large gynecological clinics there should be at least one member who is thoroughly trained in radiation therapy and who should supervise the use of radiation, whether it be x-ray or radium. Only then can we within five or ten years, establish the true value of radiation therapy in gynecology. To refer these patients to the radiologist is a mistake, for he does not know how to treat them gynecologically and the gynecologist cannot tell the radiologist how to treat them radiologically.

DR. A. J. RONGY, NEW YORK CITY.—Dr. Mosher raised the question about sterility in fibroids. I believe neither causes the other, but that it is a constitutional condition which produces each. A woman who has a fibroid has a low grade of fertility. The two conditions have no relation to each other except as a direct

result of a constitutional disturbance, which brings about the inferior grade of fertility.

In all my experience I never saw a case of placenta previa in a pregnant woman who had fibroids of the uterus, and the reason is a very good one. Ordinarily when the fibroid is situated in the uterus, there is an increased circulation and the placenta will commence to form there. The only indication, to my mind, for operation for fibroid tumors during pregnancy is pain that cannot be controlled by large doses of morphine, two, three, or four grains a day if necessary.

I am never afraid that necrosis of the tumor will take place. If the pain is relieved the fibroid will take care of itself and there will be no trouble. The great trouble with patients, who have fibroids and are pregnant, is that they may not carry to term. They usually miscarry in the third or fourth month. Maybe the reason is that the corpus luteum of pregnancy is not well formed.

I usually do a supravaginal hysterectomy and instead of including a piece from the cervix, I burn out the cervical canal with a galvanocautery. In my experience, the incidence of bleeding associated with the stump is practically *nil*. In my entire experience I only had one case.

Resection of the uterus should be done whenever feasible, because it is absolutely necessary to preserve the menstrual function of the patient during the child-bearing period.

DR. F. A. CLELAND, TORONTO, ONT.—In speaking of fibrous uteri, I would like to know whether the Doctor includes the type of case where the uterus is enlarged but where there is no fibroid of a definite type?

DR. MOSHER (closing).—I think it is a great advantage to go once in a while over these topics that are more or less controversial so as to bring before the medical public the literature on these conditions because, while it is not so important that we should have a repetition of it in a body of this sort, the importance is really that our discussions go out to the medical public through the transactions and through the Journal.

With regard to Dr. Ill's question, hysterectomy was done for pain, pain that was uncontrollable except by the constant use of morphine.

Dr. Tracy has called my attention to the fact that in his collection of statistics, 25 per cent of the patients with fibroids were fertile and 75 per cent were sterile. My statistics, which I have gained from a review of the literature, showed that there was an average of 25 per cent in which sterility existed.

In making any statement about the treatment of fibroids my argument has, of course, been limited entirely to myomata which complicated pregnancy and therefore it is not nearly as elaborate as the methods of treatment described by Dr. Weiss.

I am very pleased that Dr. Mussey and Dr. Polak emphasized the conservative method of treatment and individualization of the cases because my paper stresses that there has been too much of a radical trend, and every patient thus supposed to be immediately a surgical case. If we can emphasize the fact that we are doing more good by conservative treatment, we shall have made a long stride ahead for the benefit of humanity.

DR. WEISS (closing).—In this discussion we cannot consider the entire subject of radium, but it was my intention to bring to your attention the unfavorable features of radium as well as the advantages.

As to the question, what harm will radium do where there has been any inflammatory process, I may say that in the few cases where we did use radium in the presence of a recent or old inflammatory process we did have some reaction. One patient developed a pelvic abscess; in three others there was a recurrence of a chronic peritonitis; and one patient was very ill for several days and developed

a very marked exudate. I should like to make this point emphatic, that under no circumstances should we use radium in the presence of an inflammatory process of any kind.

Dr. Mussey brought out an important point, namely that under no circumstances should we use radium until the correct diagnosis had been made. In a few such instances we had to operate because they had been improperly radiated in other clinics. Carcinoma of the fundus should not be treated by radiation but rather by operation.

The question was asked, have we included in this group the so-called myopathic bleedings? No, they are not included in this study which embraces only the neoplastic type.

As to the size of the fibroids, it is our rule not to use radium when the tumor is larger than a three months' pregnancy. If the patient has some constitutional disease and has a large tumor that cannot be well treated with radium, we may use x-ray but we do not favor x-ray because there results atrophy of the ovaries and a shrinkage of the other tissues.

Dr. King states that one objection to the use of radium is the effect on the marital life of the patient. If radium is introduced high up in the uterus some, but not much shrinkage of the vaginal tissues may result. However, we have observed more vaginal atrophy when the radium is used low in the cervix as in treating cervical carcinoma or in treating cervicitis according to Dr. Curtis' method.

Another point that we wish to make is that radium should be used in the pelvis only by the experienced gynecologist. The radiologist has no justification for using radium in pelvic disease, as mistakes in diagnosis have brought radium into disrepute. A very careful study of every case must be made and we should explain to the patient the possibilities of radium failure. If she is willing to accept that condition and if the gynecologist has carefully considered all the contraindications, he is safe in employing radium. By such conservative treatment, we can reduce our operations fully 25 per cent.

This question should also be considered from the patient's financial standpoint. If we perform an operation, a myomectomy or a hysterectomy, it means a stay of two to four weeks in the hospital. If radium is used instead, the stay in the hospital is only four or five days. As fibroids are very common in single women, school-teachers and others having responsible positions where loss of time is a great factor, radium is particularly applicable.

DR. HENRY SCHMITZ, Chicago Ill., described the Blood Sedimentation Test in Pelvic Infections. (For original article, see p. 353.)

DISCUSSION

DR. H. O. PANTZER, INDIANAPOLIS, IND.—The diagnostic significance of temperature in these cases prompts me to call attention to the fact, yet not generally recognized, that a subnormal or low temperature by mouth often runs concomitant with a temperature one or more degrees higher by rectum, namely, whenever the seat of the infection is below the diaphragm. Hence the importance of taking rectal as well as oral temperature.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—I would like to ask the Doctor to point out the value of this test in the differential diagnosis between pelvic inflammations and ectopics.

DR. A. J. RONGY, NEW YORK CITY.—At the Lebanon Hospital the sedimentation test was carried out in 100 cases. In some instances it guided us in our procedure.

As a general rule, it may be stated that no gynecologic case should be operated

upon during the acute stage, when the sedimentation time is half an hour or less, and the operation should be postponed until the sedimentation time is at least more than one hour.

It often helps us to make a differential diagnosis between intraligamentous tumor and adnexal inflammation. Once the sedimentation time is above forty-five minutes it is safe to operate. Great increase in the rapidity of sedimentation occurs in torsion of the pedicle of ovarian tumors and in necrosis of fibromyoma. Pregnant women as a rule have an increased rapidity of sedimentation. In the puerperium a very rapid sedimentation usually means infection.

While this test has been carried out by a number of investigators still more experience is necessary in order to utilize it as a routine measure in the practice of surgery and gynecology.

DR. SCHMITZ (closing).—Laboratory tests for the corroboration of clinical findings are very valuable. Our first object in medical work is to train clinicians and secondly laboratory workers. I object to the use of laboratory tests to replace well established clinical findings. If our young medical men of today would do more clinical work and trust less to laboratory methods we would be surprised at the results.

We did not determine the safe time of surgical treatment from the findings of the sedimentation test at all. This was done with leucocyte counts and the temperature measurements. Comparing the clinical results with the sedimentation time we came to the findings and conclusions given in the paper. In fifty cases of inflammatory disease operated regardless of S. T. findings, we had only one complicated with morbidity. Therefore the old and tried methods give accurate results for the determination of time of safe operability. We did not observe a single case of ectopic pregnancy in this series and hence could not report on the differential diagnostic value.

(To be continued in the April issue)

THE NEW YORK OBSTETRICAL SOCIETY

MEETING OF OCTOBER 13, 1925

THE PRESIDENT, DR. O. PAUL HUMPHSTONE, IN THE CHAIR

DR. R. M. RAWLS described a case of **Lipoma of the Broad Ligament**.
(For original article, see page 305.)

DISCUSSION

DR. W. P. HEALY.—Several years ago, at Roosevelt Hospital, I removed a lipoma about two-thirds the size of an adult head from the right broad ligament of a negress. I attempted to drain what I thought was an inflammatory lesion by doing a colpotomy. Then I identified the lipoma and removed it. I did not do a hysterectomy. The tumor was very closely and intimately attached deep in the pelvis to the vessels.

DR. FRANK R. OASTLER reported a case of **Complete Inversion of the Uterus**.

L. F., aged twenty-two, primipara. Antepartum history was normal throughout except for secondary anemia. Menstruation began at age of sixteen, irregular, twenty-eight to thirty-one days; duration four to five days, sometimes abundant,

sometimes light. Dysmenorrhea and headaches constant. Last menstruation April 5, 1924.

Patient was delivered January 14, 1925, after three days of labor, by a median forceps operation. Presentation vertex, position L.O.A. At the time of delivery the patient was in poor general condition. The baby, born alive, weighed seven pounds, five ounces. Placenta was expelled by Credé's method without much effort. No perineal tear. Following delivery the patient suffered from considerable shock and hemorrhage, for which conditions her doctor could not account.

For one week the patient bled profusely; then the bleeding became less, but continued for two weeks more. There were no other complications except the consequent anemia. The patient was kept in bed four weeks. Examination on discharge revealed bilateral laceration of the cervix, and uterus properly involuted, otherwise negative. Five days after returning home the patient called her doctor complaining of a heavy feeling in her pelvis, constant bearing down, and extreme weakness.

Examination revealed a mass in the vagina like a fibroid polyp. The diagnosis of inversion of the uterus was made and the patient referred to me. She was admitted to the Lenox Hill Hospital March 26, 1925, six weeks after delivery. She was well nourished but very pale and weak. General physical examination was negative. Urine was normal except for 0.7 per cent sugar. Blood, R.B.C. 2,820,000. Hg., 42 per cent. Blood Chemistry: Urea nitrogen 15.5, Creatinin 1.4, Uric acid 2.7, Sugar 0.141, CO₂ 51.9. Blood pressure 95/60. Temperature 98.6° F. Pulse 90. She complained of constant bearing down sensations but no pain.

A pear-shaped tumor filled the vagina. It was soft, and dark red in color. The surface bled easily. This tumor projected from the cervix and was continuous on all sides with the lip of the cervix which formed a collar around its base. No fundus was felt in the abdomen. Adnexa were not palpable. No pelvic tenderness.

The patient was transfused with 600 c.c. of blood, and following transfusion, the blood count was 4,360,000 reds, hemoglobin 65 per cent. She felt very much improved. Two days later, under anesthesia, the cervix was gradually dilated manually and the fundus gently forced back into place. This was accomplished without great effort and bleeding was moderate. On account of the inexperience of the operator with inversion of the uterus, and recognizing the possibility of abdominal complications, it was decided to perform an exploratory laparotomy. A vertical incision two inches long was made in the median line, beginning three inches below the umbilicus. The pelvis was found to be filled with a clear, serosanguineous fluid which was removed. The uterus had recovered its normal shape and position. The adnexa were normal. No adhesions were present. On the posterior wall of the fundus (the apex presenting at the top) was an irregularly triangular area of necrosis, the sides of which were one inch long. Incision into the area was bloodless. The necrosis extended completely through the muscular wall of the uterus. This area was removed, the incision extended into the uterine canal and the wound was closed with three layers of catgut. The abdominal wound was closed layer by layer. Recovery was uneventful. On discharge, two weeks later, the fundus was firm, small, and in good position; the cervix was soft and patulous. The patient was in good general condition.

The literature on inversion of the uterus includes 641 cases; 81.2 per cent were obstetrical in origin, 13 per cent were due to uterine tumors, 2.2 per cent was postmortem, 2 per cent were idiopathic, and 1.6 per cent were postabortive. Jones reports 1 case in 128,000 in institutional work.

The mortality reported is 41 per cent. Jones finds that the diagnosis was made in 191 cases as follows: 19 immediately, 44 after the delivery of the placenta, and 141 within twelve hours. In another series of 158 cases, 67 are diagnosed within six weeks, 52 within six months, and 40 after one year.

French reports a case similar to the one here reported, discovered four weeks after labor, in which repeated examinations were made for the first three weeks and conditions were found normal. The inversion occurred in the fourth week.

DR. F. C. HOLDEN reported two cases of **Inversion of Uterus**.

Mrs. B. S., aged eighteen, para i. Admitted to obstetrical department of Bellevue Hospital, December 6, 1923, in labor. Normal spontaneous delivery at 2:00 A.M., December 7. Spontaneous delivery of placenta except for a small fragment which was subsequently removed by Credé's method and pituitrin, followed by considerable hemorrhage. Patient went into shock which necessitated hypodermoclysis and two transfusions.

Note appears on the chart that one hour and ten minutes after delivery, what apparently looked like a clot appeared at the vulval orifice (probably inverted uterus), with marked dimpling of the fundus. No vaginal examination made on discharge.

After leaving Bellevue she felt very well; had vaginal bleeding Jan. 6, 1924, lasting two days and Feb. 1, 1924, two days. On Feb. 9 there was profuse bleeding for about two hours, with numerous clots. Consulted a physician who sent her to Christ Hospital, Jersey City. Dr. William Freile wrote, saying: "She had a complete inversion of the uterus and was very much exsanguinated. Was taken to the operating room and anesthetized but bled so profusely that a McGraw ligature was placed around the uterus and she was put back to bed. The ligature was subsequently removed and an attempt made at replacement by using a Voorhees bag. This procedure met no perceptible change in the condition and before any other operative procedure could be attempted, she was removed from this institution."

On admission to the gynecologic department of Bellevue on Feb. 25, 1924, the following findings were noted: Good parous abdominal wall, no points of tenderness, no palpable tumors. Good parous pelvic floor. A foul mass presenting at the vulva. Posterior rim of the cervix can be felt with a globular mass about 1.5 inches in diameter extruding from it. Anteriorly the cervix fuses into a globular mass. Fundus not palpated above. No palpable adnexal pathology. Speculum examination shows a sloughing mass which can be traced up to the posterior lip of the cervix; anteriorly it extends higher up. Normal vaginal mucosa showing superiorly.

Diagnosis.—Inversion of the uterus with sloughing.

Treatment consisted of elevating the foot of the bed and using antiseptic hot douches.

March 8, following note made: Tissues appear to be more healthy. No slough, but profuse white discharge.

March 14: Vaginal findings completely changed, fundus not inverted. Slight bilateral lacerations of the cervix. Considerable mucopurulent discharge.

April 18, at time of discharge: Good parous pelvic floor. Cervix in axis of vagina, slight laceration. Fundus small, retroverted, movable. No adnexal or parametric abnormalities palpable.

Mrs. M. K., aged twenty-five, para iii. The patient was seen in consultation at Bellevue School of Midwives, July 28, 1925, with the following findings noted: Uterus and cervix completely inverted, lying in vagina. Fundus well-involuted, forming an ovoid mass 6 cm. in diameter. No definite cervical rim can be felt at upper extremity of vagina but merely a cuff of mucous membrane. Uterine tissue very friable and the endometrium which presents, bleeds on the slightest

manipulation. The bladder dips only a short distance into the anterior wall of the inverted cup. Cervix dilated about 3 cm., soft, and enlarged. Tubes and ovaries normal. History of spontaneous delivery at 1:35 A.M., July 9, Credé's method was used excessively at 2:00 A.M.; uterus inverted with placenta attached. When seen by resident physician at 2:30 A.M., the patient was in shock, with a large mass between the thighs which consisted of uterus and placenta attached. Placenta separated from uterus with difficulty. Uterus pushed up into vagina and held in place by large pack; 500 c.c. of gum glucose were administered immediately with other antishock measures, and at 3:00 P.M., 550 c.c. of blood by transfusion. At both previous deliveries the patient had had adherent placenta, with blood transfusion after second delivery, preceded by manual removal of placenta.

Transferred to Gynecologic Service July 28, 1925. Treatment consisted of high elevation of the foot of the bed, and hot vaginal douches until August 7, 1925, when an unsuccessful attempt at reduction under anesthesia was made. Spinelli operation was done August 7, together with posterior colpotomy. Moderate right postoperative thrombophlebitis.

Discharge note: Sept. 15: Good parous pelvic floor. Cervix in axis of vagina, regular in contour. Fundus normal size, slight retroversion. No adnexal or parametric abnormalities palpable.

DISCUSSION

DR. A. M. JUDD.—I have seen two cases of inversion of the uterus. The first was an acute case and the patient died within a short time. The other was a chronic case in which the condition had existed for nine months. I reported this case before the Society about three years ago.

I did a Spinelli operation from below, first having studied the condition from above through laparotomy incision. This I did to prove or disprove the many statements made regarding the pulling or nonpulling in of the bladder, tubes, and ovaries into the cup of the uterus formed above by the inversion. Many authorities state that these organs are not pulled in. They were in this particular case, and I believe they would be in any case of inversion of any extent.

The woman with the chronic case of inversion was subsequently delivered of a living child.

DR. HARVEY B. MATTHEWS.—I have seen two cases of inversion of the uterus within the last few years, one of them chronic and the other subacute. The chronic case was of nine weeks' duration. Under deep anesthesia, we failed to reduce *per vaginam* the inversion through the cervical ring. We then opened the abdomen and by stretching the ring from the abdominal side were able, by abdominal-vaginal manipulation, to reduce the uterus very satisfactorily. The woman died of general sepsis on the eighth or ninth day after the reduction.

The inversion in the other case was of two weeks' standing. This may or may not be considered subacute. The inversion was very easily reduced by vagina. After reduction, we packed the uterus firmly with 2 inch packing which had previously been soaked in 4 per cent mercurochrome. One-half of the gauze was removed in twenty-four hours and the remaining one-half in forty-eight hours. The patient had one blood transfusion of 400 c.c. for the acute anemia immediately after the uterus was reduced and packed. She made an uneventful recovery.

Dr. Oastler referred to the advantages of opening the abdomen in these chronic inversion cases to ascertain the condition of the cervical ring and adjacent tissue from above. There is apt to be necrosis, sloughing, and infection present. In the presence of one or more or all of these conditions, hysterectomy should be done.

DR. WM. S. SMITH read a paper entitled **Obstetrical Heresies at the Brooklyn Hospital.** (For original article, see page 324.)

DISCUSSION

DR. HAROLD BAILEY.—I feel that the best way to discuss the subject is to present the results of my service with the conservative methods employed at Bellevue Hospital in 1923, 1924, and 1925, in 2091 indoor cases. In addition, we were responsible for 1308 cases from the School of Midwives, or a total of 3399; practically all the abnormal cases.

I have never used the internal rotation procedure for occiput posterior, but I am not prejudiced against it, and I believe that in those cases in which it is necessary to do a high forceps operation it would be better to roll the head and shoulders and allow the presenting part to go further into the pelvis. Dr. Smith's results show the advisability of internal rotation, for he had but one high forceps as against the 19 that we had. We had 78 primiparae requiring operative procedure for occiput posterior position or, if we add the School for Midwives group, a total of 84. On the indoor service, i.e., in 2,099 cases, we found it necessary to do 75 forceps and 3 versions. Dr. Smith did 98 rotations in 2,000 cases. He lost 10 babies (stillbirths and neonatal deaths), or 10.2 per cent. We lost 5 babies or in our total group of 84 cases, 6 babies. In other words we had a mortality for the indoor group of 6.4 per cent and for the entire group 5.9 per cent. These figures are lower than the normal death rate when the stillbirths and neonatal deaths are added together.

In discussing the use of forceps, we will leave out the cases of forceps control because every one will admit that there is no danger in the procedure, and it is regularly used by all of us. In the other forceps cases, Dr. Smith had an incidence of 24 per cent as opposed to our 9.4 per cent. In our forceps delivery we had one maternal death. This patient had a pyelitis. After ten days her temperature dropped to normal where it remained for three days. She then had a cerebral hemorrhage which was both intradural and extradural. I believe that this was a case of septic thrombosis and that the end-result had nothing to do with the forceps procedure.

In the Brooklyn Hospital they cut the perineum in 65 per cent of all their cases and we cut it in 1.9 per cent. In the entire group, they cut it in 872 cases, we cut it in 40. Dr. Smith had a total of 23 complete tears, and 6 others with loss of sphincter control; we had 5 complete tears.

In this connection another point should be mentioned. I have always felt that in properly conducted obstetrics two doctors should be "washed up," although both in private and hospital practice we still have but one. However, if two men are ready to operate we feel that one of them should be a visiting surgeon of the hospital, for we surmise that when both operators are internes, an unnecessary amount of surgery will be done.

We do not treat hemorrhage in the same manner as at the Brooklyn Hospital. Rather than lose time with douches, we inject pituitrin. If this does not control the bleeding we at once insert into the uterus a large sized uterine packer through which we pack the cavity with iodoform gauze. We had 11 cases of postpartum hemorrhage with one death and 12 cases of manual removal of the placenta with one death, or a total of 23 cases with two deaths.

In 3399 cases, we did 57 cesarean sections, or 1.7 per cent without maternal deaths, but there were 7 infant deaths, a rate of 12 per cent. Twelve of our patients, or 21 per cent, had fever postpartum.

In this group of cases we employed the low flap cesarean section 44 times, and we feel that this procedure allows us to operate on patients who have been examined by midwives and doctors elsewhere. However, we do not intimate that

we would do an abdominal operation on a woman who has been manhandled with forceps for an hour or two; in such cases a craniotomy must be considered. Since 1921 we have not lost a patient with cesarean section whereas prior to that time, with sections performed in the old-fashioned manner, we lost several.

We had 22 maternal deaths, or 0.64 per cent in 3399 cases. Dr. Smith's percentage was 0.65. If we take our indoor cases alone and deduct seven deaths due to medical conditions (a deduction permitted by the statisticians), and one patient with postpartum hemorrhage who died five minutes after arrival, we have 14 deaths in 2091 cases, or 0.65 per cent.

In regard to fetal mortality we are not so fortunate. We have a rate of 10 or 11 per cent instead of 3.8, but we include abortions and miscarriages from the fourth month on; and in our hospital, we have a good many of these.

In closing I should like to ask Dr. Smith if, when he says he rotates the head 180 degrees, he does not mean that the body of the child is rotated 180 degrees.

DR. R. L. DICKINSON.—In presenting this work I think perhaps Dr. Smith might add that much of this is deliberate clinical research rather than establishing a standpoint which he and Dr. Pomeroy might ask to have generally applied to obstetric procedures. These measures can be tried out in hospitals when they could not be tried out elsewhere. I am speaking particularly of the high manual rotation which Dr. Pomeroy perfected and carried through with extreme skill and adapted to proper cases, because no man of his generation was more conservative or, to my mind, a better obstetrician. He developed and he carried out an idea of many years ago when I brought up all the literature and reported some cases of cesarean section in *Surgery, Gynecology and Obstetrics* in 1910. Unless you put your hand into the uterus you do not know how many of these retraction rings cause obstruction. Twenty-four out of 82 of the high rotation cases belong in the group of retraction ring cases. Suppose one tried to deliver with forceps under those conditions. In other words, you can easily see that these are serious cases. I think Dr. Smith should pick out these retraction ring cases and make a special series of them, because twenty-four constitute a larger single group than I remember of finding in the literature.

I spoke of clinical research. This was deliberately planned and carried out in the case of that inordinate number of forceps deliveries. Naturally criticism has been directed to Dr. Pomeroy on this basis. I draw attention to the fact that for years the staff reviews in the Brooklyn Hospital obstetrical service have been real reviews; that is to say, every casualty goes into the calamity book and is summarized and we are able to follow these through. The thing done there I have seen done nowhere else, and it has been going on for some years now. It is done nowhere in the forty-four staff reviews I visited in leading hospitals. We do not simply take up every death and every complication and everything that goes wrong, but each case is "cleared" or it is "not cleared" in the records of the staff review. It means that a man cannot avoid operating in order to hold down his mortality record when he should have operated. On the contrary, he has to do everything he can to save the patient. We vote and the general consensus of opinion clears or does not clear the case.

The dilatation of the sphincter I regard as a great advance. However, I do not agree with the early repair of the sphincter. Two days later anatomical restoration can be more easily made.

I draw attention to the small number of postpartum hemorrhages and the results. The high hold of the uterus was something I began to practice forty years ago and published in the Brooklyn Medical Journal in March, 1899. Dr. Pomeroy rediscovered it and made an independent study of it. If you push the uterus down into the pelvis you will simply double it on itself; you cannot get a hold on it, but

if you lift it clear up out of the pelvis you can handle it as you would a small melon or gourd and can get it between your two hands.

The frequency of cesarean section is a thing that calls for general public comparison. We have a report of incidence under 2 per cent.

For maternal mortality and the stillbirth mortality, what is the standard? I have been trying for the past five years to get the American College of Surgeons to publish such mortalities. In New York it is very difficult to work out fetal mortality, for the City Hospitals are publishing their abortions as stillbirths. For comparison of results we have to throw out that whole group. Only when we call things by the same name will our results be comparable.

DR. ELIOT BISHOP.—Dr. Smith has not attempted a complete review of 2,000 cases; he has only taken the aspects in which his hospital seemed heretical and told the results. I wish to emphasize that he reported only the *recognized* posterior positions in *primiparae*, and of these, less than 43 per cent had a manual rotation. He says that injury to the child or to the placenta is rare and I have never known of an instance.

In Table II we may note that 30 were practically spontaneous deliveries; there was only one high forceps application. Speaking of forceps, the frequent use of which is another charge on the heresy count, note that in Table IV there were only 70 high or mid-forceps cases in more than 1,250 vertex presentations.

I am not a confirmed convert to the use of the guard stitch, though I have used it in my private work one hundred times or so. If I expect great damage from an extraction, I use the mediolateral incision which gives as much room as the lateral with much better results in repair.

DR. W. H. CARY.—I want to ask Dr. Bailey what his morbidity is in patients in whom the uterus has been packed. Does he think it makes a difference in their convalescence, as compared with the cases which are not packed?

DR. HAROLD BAILEY.—Yes, I think packing the uterus does cause fever, but I have never regretted doing it. I have seen one or two cases of iodoform poisoning and a number of cases of endometritis (fever lasting a few days), but I think the procedure is life-saving and I would not undertake to deliver a patient unless I were prepared to pack the uterus following delivery.

I should like to know whether the contraction ring that was found twenty-four times ever stopped or interfered with the progress of labor.

DR. JOHN O. POLAK.—I would like to say in answer to the point that Dr. Bailey brought up, that retraction rings do interfere, so much so that I personally have had to do six cesarean sections for no other cause, whatsoever, than the formation of a retraction ring about the child's neck.

DR. W. S. SMITH.—In a way, Dr. Bailey's comparison is hardly fair, for nearly all of our cases are of a better social class and it is possible to give them better prenatal care and more intelligent management during the first part of labor than is the case with patients who go to a charity hospital.

In regard to our rather large number of forceps control and perineotomies, I think that the examination of these patients' perineums six weeks after labor shows that they are much more firm than in patients who have had a spontaneous delivery without incision.

It is true that the sphincter ani muscle is rather frequently invaded, but if the sphincter is thoroughly dilated before delivery we have very little trouble with healing, or in obtaining a satisfactory functional result. In fact, there has been only one woman on whom it was necessary to operate a second time.

In regard to hemorrhage and packing the uterus; we were taught by Dr. Pomeroy that if we pack the uterus we run some danger of infection.

He also thought that packing a uterus ballooned it and that it was difficult to determine when the uterus was packed full. He taught us to control the uterus by extraabdominal manipulation, and he firmly believed this method to be better than that of intrauterine packs.

Since this paper was written I have learned that Dr. Robert L. Dickinson published an article in the *Brooklyn Medical Journal* for March, 1898, in which he described and illustrated this method of lifting and manipulating the uterus through the abdominal wall to control postpartum hemorrhage.

In compiling my figures on fetal mortality, I was in doubt as to when an infant's death becomes a chargeable obstetrical death. Surely it is not fair to include in these figures abortions at a period of two, three, or four months' gestation.

I have therefore arbitrarily included in my fetal mortality list, only those babies which weighed five pounds or over.

Dr. Bailey asks a question about rotating the vertex through an arc of 180 degrees. We usually try to do the rotation by grasping the vertex, but if the body does not easily follow we do the rotation by grasping the child's shoulder. The end-result must be that the body as well as the vertex must be rotated through an arc of 180 degrees.

In regard to Dr. Dickinson's statement that he prefers to repair the sphincter and two or three days later, I doubt if the Doctor made it a routine to dilate the sphincter before delivery. Dilatation of the sphincter before delivery is the key to the situation. If this is done the cut or lacerated ends of the sphincter muscle do not retract, and an immediate repair is possible and the results are satisfactory.

Dr. Titus spoke of the difficulty he had in delivering his patient in whom there was a retraction ring, and that he finally performed a version. We find that it usually requires a hard pull on the forceps to deliver a child through a retraction ring. We use deep ether anesthesia which I think relaxes the ring to some extent, but even then the first pull is always difficult.

We leave the placenta within the uterus in cases where we cannot express it, if there is no bleeding, because we think it is safer to do this than to do a manual extraction. These patients are carefully watched by competent internes and if there are signs of hemorrhage the placenta is extracted at once. Usually, however, the placenta comes away spontaneously a few hours later.

NEW ORLEANS OBSTETRICAL SOCIETY

MEETING OF NOVEMBER 19, 1925

DR. P. B. SALATICH reported a case of **Acute Appendicitis Incarcerated in a Right Inguinal Hernia:**

The symptoms and history pointed to acute appendicitis. Physical examination, however, disclosed a right inguinal hernia, which was extremely sensitive and tender on palpation. This mass had been present for several years and several times a year, coincident with the menstrual periods, it would increase markedly in size and become acutely tender. Within a few days after the cessation of her menses it would return to its original size. The condition was suspected to be an ovary incarcerated in the hernial sac. Incision over the mass, however, revealed the contents of the sac to be the outer half of the appendix, which was very acutely inflamed, probably due more to the constriction of the sac than to inherent pathology.

DISCUSSION

DR. W. E. LEVY.—I recall reading in a recent issue of the *Journal of Obstetrics and Gynecology of the British Empire* a report of "misplaced" uterine mucosa,

and I am wondering if this was not a similar case. It is somewhat similar in etiology to a Sampson cyst or transplants of the endometrium. I have seen several case reports also of tumors of the round ligaments due to endometrial tissue being found in the inguinal canal. May I ask what the microscopic report was in this instance?

DR. SALATICH.—Microscopic examination was made, but no uterine mucosa or other alien tissue was found. I might add that the operation was attended with considerable difficulty because of the tedious dissection of the sac necessary before the base of the appendix could be reached. The acute condition, you will understand, was entirely extraabdominal. It is generally known that women who are subject to chronic appendicitis have more trouble during menstruation than at other times, and in this particular instance the inflammation was naturally increased by the constriction.

DR. E. L. KING reported A Case of Pernicious Vomiting of Pregnancy Cured by the Use of the Duodenal Tube, in which Death Ensued Later from Myocarditis.

This patient was admitted to the Charity Hospital August 4, 1925, a little over three months pregnant, with a history of vomiting since June 1. Practically nothing could be retained. Her blood sugar on admission was 100. After the administration of 1,000 c.c. of 5 per cent glucose solution it rose to 117, then went down to 91. She was treated first with glucose and insulin subcutaneously, and later by the same agents intravenously. Most of the time her pulse was over 100 and her general condition was poor. She showed much improvement under this treatment. Then, by the twelfth day for no apparent cause, she began to lose ground, and a repetition of the glucose and insulin treatment had no effect whatever on her vomiting. On the seventeenth day repeated efforts to pass the duodenal tube were made with no success. Her condition then was apparently so grave that abortion was considered justified, but this suggestion was rejected by her because of religious scruples. On the eighteenth day a Matas continuous drip of glucose and insulin was started, both arms and the right ankle being used in turn, and considerable difficulty being experienced because of thrombus formation. She received as much as 4,600 c.c. of the solution within twenty-four hours, which is possibly an excessive dosage. The vomiting continued without relief in spite of this treatment, and on the twenty-seventh day we again resorted to the duodenal tube. This time we succeeded in getting it down. As the acid product of digestion causes the pylorus to open, possibly the injection of acid into the tube while it lay in the stomach might have the same effect. The injection of a dram of dilute hydrochloric acid was followed immediately by the entrance of the tube into the duodenum, as was proved by the aspiration of bile. The patient was fed through the tube every 2 hours until September 3, first milk and glucose solution, later a more liberal diet. The vomiting was checked almost immediately and before the tube was removed the patient was fed by mouth for several days, retaining everything. Her pulse had continued rapid throughout the course of her illness, she was very weak, and occasionally delirium of a mild type was present. Fluid was then found in her chest. The liver was enlarged. A myocarditis was believed to be present, which antedated the pregnancy. For a time there was a moderate improvement in her general condition but on September 19 she took a decided turn for the worse, and died 4 days later. 19 days after the vomiting had been permanently checked and all nourishment retained.

The case is interesting to me in that glucose and insulin, which have been almost uniformly successful in our hands, did no good at all in this instance, and in that the vomiting was finally checked by the use of the duodenal tube. Then,

although the internist considered that the myocarditis was preexistent, there is a question whether it did not arise from the toxemia of vomiting. Her chances might have been improved by the abortion which she refused. At any rate her condition, at the time we advised it, was sufficiently good to warrant the procedure.

DR. J. S. HEBERT read a paper entitled **A Critical Analysis of 250 Prenatal Charts with Some Pertinent Comments Thereon.** (For original paper see page 387.)

DISCUSSION

DR. E. L. KING.—Prenatal care is today so generally accepted that the discussion of its advisability is hardly necessary, though I am not so sure that the theoretical principles are always put into practical application. Formerly the patient was seen when she appeared with her self-made diagnosis of pregnancy, which was usually accepted without question, after which she went her own way until she went into labor or had a convulsion. In my experience prenatal care is more successful in the clinic patient than in the private patient, or rather, to express it differently, the clinic patient is more appreciative of your efforts than is the private patient. The colored patients in particular for the most part return as directed very willingly, and really with considerable enthusiasm. Two points impressed me particularly. The first is the question of automobile rides, which is a matter of moment today, even with clinic patients, who seem able to pay for their cars even if they are unable to pay their physicians. I have had more than one case in which I am perfectly certain the baby was born prematurely or abortion occurred because of a ride over bad roads, particularly in the Ford type of car. Premature labor after sexual intercourse is rare and I found Dr. Hebert's case in point very interesting. I believe it would be worth reporting, and I certainly think our patients should be warned of the possibility of such an occurrence.

DR. PHILLIPS J. CARTER.—Dr. Hebert's paper shows what intelligent prenatal care can accomplish. I usually permit my patients to take all the exercise they wish. I have even permitted a patient eight months pregnant to take an automobile ride of 75 miles without harm, though I must admit that she was driven slowly, over good roads, in a car with excellent springs. I have personally operated on one case, a bad appendix, during pregnancy, in which I also did a suspension for agonizing pain caused by a former posterior fixation in the pelvis, in which the patient went to term and had an uneventful labor. I have also seen several instances of automobile accidents of a rather grave character, in which the pregnant women suffered no ill effects. I believe that as a rule the women who abort under these and similar circumstances have unstable nervous systems, and that the least shock of a physical character, or, in rare instances, even of an emotional character, will produce abortion.

DR. HEBERT (closing).—In some instances the albumin was found at only one examination, and in no case was it found in large amounts. In one of the cases of premature labor following an automobile ride, both parents were normal in every respect, both physically and intellectually. The pregnancy unfortunately antedated the marriage, and for this reason there was considerable excitement and nervousness on the mother's part. When she suggested an automobile trip I vetoed it decidedly, but she disobeyed my express instructions, and when next I heard from her she was in a hospital somewhere up in the country and the baby had been lost. I mention this case in detail because it seems to substantiate Dr. Carter's point that the nervous element is a factor to be reckoned with.

DR. LUCIEN A. LEDOUX read a paper entitled **Full-Term Extrauterine Pregnancy with Report of Three Cases.** (For original paper see p. 395.)

DISCUSSION

DR. JOHN F. DICKS.—I have personally seen two of these cases and I agree entirely with Dr. LeDoux that the most difficult feature is the handling of the placenta. If you remove it, you run the risk of active hemorrhage, with possibly death on the table. If you leave it *in situ*, you have the grave risk of sepsis afterwards. If it is attached to the intestines the condition is peculiarly dangerous, because the chorionic villi burrow into the tissues. In one case I saw, which was later operated on by Dr. Peter Graffagnino, the patient was sent in with a diagnosis of ovarian cyst and paracentesis had been attempted; at operation a trocar wound was found in the child's back. Correct diagnosis before operation is essential and I believe, too, that laparotomy in these cases is so grave that only a thoroughly experienced surgeon should attempt it.

DR. C. A. WALLBILLICH.—I have seen two of these cases, but in both instances the babies were dead, which simplified the handling of the placenta. I think the principle of closing the abdomen without drainage is rather generally accepted today. Removal of the placenta, if the child is alive, certainly invites active hemorrhage, and drainage unquestionably offers a risk of sepsis, so that the dilemma is twofold in any case.

DR. P. B. SALATICH.—As a rule I do not consider the diagnosis of abdominal pregnancy difficult because of the unusual ease with which the fetal parts may be mapped out, and the unusual loudness of the fetal heart beat. In my case the diagnosis was rather more difficult, but abdominal pregnancy was finally definitely established. As the head was apparently pointing towards the vagina and rectum, Dr. Lewis, following recent suggestions to that effect, decided to endeavor to extract the child by colpotomy. I have never seen a more difficult or a more thoroughly unsatisfactory operation, and I would never advise another attempt to deliver an abdominal pregnancy by this route. Both mother and child were lost. Delivery by colpotomy is wrong surgically on the face of it because the placenta presents insuperable difficulties, even by the abdominal route. The two dangers, of course, are active bleeding and sepsis. Theoretically, I think it is wiser to leave a large opening for drainage, even at the risk of postoperative hernia. A ventral herniotomy on a live woman is preferable to a wound which has healed by first intention in a dead one. May I ask Dr. LeDoux what his idea was in closing the abdomen in the third case, with the placenta *in situ* and no drainage?

DR. PHILLIPS CARTER.—I have operated on only one case of this nature, at Charity Hospital, but I am not sure that it is included in Dr. LeDoux's summary, as part of the record was lost. The patient was admitted to my gynecologic service with a diagnosis of uterine fibroid. The history and physical findings, however, established the diagnosis of extrauterine pregnancy of 12 months' duration. At operation the fetus was found dead and the placenta had been almost completely absorbed. The mother died of sepsis. I do not believe, however, if the baby is living and we have an active placental circulation to deal with, that there is any chance of absorption. I have been wondering about the possibilities of treating such cases by marsupialization, suturing the placenta and membranes to the abdominal wall. A hernia may develop, but I think the patient's chances would be better. Particularly in cases where the placenta is adherent to the intestines I believe this technic deserves a trial.

DR. LEDOUX (closing).—Let me remind you that in the three cases which I reported, in two the babies were alive, and in these the mothers died. In the

remaining case, in which the child was dead, the mother recovered. Fortunately for us the latter condition is the usual one, or the mortality for this condition would be even higher than it is now. The number of living babies reported in the literature is very small. Obliteration of the placental circulation makes the handling of the placenta a simple matter, for removal of the entire mass is usually relatively easy under these circumstances. I have found, from a study of the authorities in this field, that the plan most in favor at present is closure without abdominal drainage. In the 8 cases in the Charity Hospital series which were discharged as cured, the placenta was either entirely or partially removed in every instance. The practice of suturing the placenta to the abdominal wall is now looked upon as obsolete, and in the recent literature, closure without drainage is advocated. Dr. Salatieli's statement that the diagnosis is usually easy because of the ease with which the fetal parts may be mapped out is not quite correct. A few months ago I saw a case in consultation in which the physician in charge, against my advice, decided on exploration under local anesthesia. The fetal parts were as near to the skin, apparently, as in any of the cases which I have reported, but when the abdomen was opened the pregnancy was found to be intrauterine. In answer to Dr. Phillips' question as to the mode of production, I would say that the pregnancy was apparently of tubal origin in all 3 of my cases. I do not believe that primary abdominal pregnancy is today considered anything beyond a theoretical possibility. Reverting to the question of the placenta, I might say that in the first case, in which autopsy was permitted and in which the placenta had been left *in situ*, it showed a beginning separation at the time of the postmortem, and the membranes and cord had disappeared. In the last case, I believe I should have done more with the placenta than I did. The fetus lay free but the placenta was apparently adherent to most of the pelvic structures and removal was out of the question. In such a case the decision is difficult, but I believe, even now after the fatal outcome, that if I had attempted to do anything more at the time of operation the patient would have expired on the table.

DR. GEORGE A. MAYER read a paper entitled **Cystadenoma of the Ovary with Report of Cases.** (For original paper see p. 383.)

DISCUSSION

DR. W. D. PHILLIPS.—Ovarian surgery offers some of the most perplexing problems which confront the gynecologist. We had recently on our service a bilateral pseudomucinous cyst of the ovary containing several gallons of fluid. Delivery of the tumor with its fluid intact was manifestly impossible, but on the other hand, no chance could be taken of spilling this fluid, with its possibilities of malignancy, into the abdominal cavity. We therefore attempted to meet the situation by puncturing the tumor and drawing off the fluid, at the same time holding it upon each side with forceps and gradually easing it out of the cavity. These tumors are frequently multiple, and sometimes one can be ruptured into the other, though a different incision may be necessary for each one. This case illustrated very well Dr. Mayer's point about the shock which at times follows the release of such tremendous quantities of fluid. The patient had a fairly smooth convalescence and when I heard from her some weeks after her discharge she had continued to improve. Dr. Mayer did not go into the question of other types of cyst, hemorrhagic, dermoid, etc., but particularly in young women, when both ovaries are more or less involved, the question of the proper procedure is often a bewildering one. If enough normal tissue can be conserved I believe ovarian transplantation is a good thing. In older women, or when the growths are definitely malignant, bilateral removal is unquestionably the only safe procedure.

DR. E. L. KING.—The diagnosis is not by any means easy, in fact, it is sometimes very difficult. My case was in a colored girl, eighteen years of age, whose youth helped to throw us off the track. She came to a clinic in January, with a history of being eight months pregnant. The physician who saw her agreed with her diagnosis. She was told she would deliver in February, but when she was seen again in February the date was advanced to March. In June she came into our clinic to find out why she had not delivered. We could find nothing in the least suggestive of pregnancy then, and the question arose, in view of her history and the diagnosis of pregnancy in the other clinic, whether she was carrying a dead fetus. The x-ray at once established the fact that no fetal parts were present, and the diagnosis of ovarian cyst was fairly simple. I might add that the girl had a very tense abdomen, so that palpation of the fetal parts, if they had been present, would have been very unsatisfactory and confusing.

DR. MAYER (closing).—There are no Krukenberg tumors on record at Charity Hospital, so far as I could discover. An investigation of this sort is most unsatisfactory under the present system of records; the histories are simply filed under ovarian cyst, with no attempt at differential diagnosis on the index card. That is why I could make no general report from the hospital, but was obliged to confine my investigation to our own service, where we keep our private files. In regard to diagnosis, the condition does simulate pregnancy and before operation it is well to eliminate this possibility by an x-ray examination. Because it is impossible to tell before the operation or even at the time of operation whether these conditions are malignant, it is wise in every case to take particular care that none of the fluid is spilled in the abdominal cavity. If the condition does prove malignant, it is usually of a rapidly fatal type. If the fluid is spilled by any mischance, I believe deep ray therapy is indicated at once, i. e., after 6 weeks, as a prophylactic measure. Microscopically the structure of a pseudomucinous cyst shows many goblet-shaped cells, a thin basement membrane, with a clear space above which shows definitely the origin of the secretion, as the pseudomucin takes no stain.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

THE DIFFERENTIAL DIAGNOSIS OF ECTOPIC PREGNANCY

BY E. M. FROMMER, M.D., ST. JOSEPH, MO.

IN the entire field of medicine there is hardly a chapter more difficult and important than the differential diagnosis of acute abdominal affections. The diagnosis here offers much difficulty and involves great responsibility, since in many cases it must be decided whether the treatment shall or shall not be immediate surgical intervention.

Among those affections which appear suddenly and require immediate intervention, extrauterine pregnancy plays undoubtedly the most prominent rôle. Surveying the most frequent abdominal diseases requiring instant attention, it becomes evident that cases of strangulated hernia, perforated gastric ulcer, acute appendicitis, and the different forms of ileus, although being dangerous conditions, do not require quite such prompt interference as the ruptured ectopic pregnancy.

This subject is of interest to every one confronted with acute abdominal symptoms, for in many cases diagnosed as some entirely different abdominal disease, operation reveals an unexpected ruptured ectopic pregnancy. As is well known, the difficulties of differentiation are due largely to the fact that many cases of extrauterine pregnancy are atypical in symptomatology, presenting some of the characteristic symptoms, but lacking others. The symptoms often do not give the classic clinical picture, being more or less pronounced or partly obscured, simulating other different abdominal affections, delaying thus the decision for instant surgical interference and then causing hesitation or erroneous medication. In many cases this means a fatal outcome for the patient.

Many writers have called attention to an increased frequency of ectopic pregnancy in the last few years. This is confirmed by the statistics obtained in the last five years, showing in comparison to the average pre-war statistics of 0.60 per cent an increase of incidence to 1.25 per cent. According to pathologic investigations the ectopic pregnancy does not possess a uniform etiology. The leading factors in producing this anomaly are gonorrhea and maldevelopments of the female genital tract. Better information concerning this condition enables the physician today to detect it more often and more readily, and this accounts for the present increase in the number of ectopic pregnancies now properly diagnosed and operated. But in spite of our advanced knowledge and better appreciation of the importance of early diagnosis, the extrauterine pregnancy still is accompanied by a mortality, which cannot fail to prove unsatisfactory. There are too many cases revealing the

wrong diagnosis only at autopsy or being buried without definite proof of a false interpretation of the symptoms.

RELATIONS OF INTACT ECTOPIC PREGNANCY TO INTRAUTERINE GESTATION.

It is well known that the early symptoms of ectopic pregnancy are not, in many instances, indicative of the gravity of the pathologic changes. The manifestations of the uninterrupted case are usually so slight that most of the patients are unaware of the existence of any abnormality until a rupture unexpectedly occurs, which may prove fatal even before the patient has missed a single menstrual period. In exceptional cases the soreness will be so well localized to one side and so marked, particularly by exertion, and the tenderness of the little mass so very pronounced on palpation in a patient previously perfectly well, that a diagnosis of tubal pregnancy may be definitely made without great difficulty before rupture. The early signs of pregnancy are usually more or less present also in ectopic pregnancy. Therefore, the cessation of menstruation, the lividity of the vulva, the enlargement of the uterine body, the pigmentation of the nipples, the softer consistency of the lower uterine segment, and the condition of the adnexa are of little value in regard to the diagnosis of tubal gestation. The enlargement and tenderness of the involved tubal segment may be so slight that the diagnosis by means of the tubal changes in this early stage is practically impossible. The observation that the uterine body is smaller than could be expected for the gestative time is of very little aid, since this sign may be indistinct at a time, when the tubal changes are well advanced and tubal abortion or rupture imminent.

Yet there are two symptoms of value in pointing to the possibility that one has to deal with an uninterrupted extrauterine pregnancy. These are the erectility and the consistency of the uterine body. As is well known, one of the valuable early signs of intrauterine pregnancy is the increased erectility of the uterus at a time, when all other characteristic signs may be absent. While palpating the uterus bimanually its body responds with a distinct contraction, which attains its maximum within twenty to thirty seconds and is then suddenly followed by relaxation. This important sign is observed in 92 per cent of early intrauterine gestations and can be explained only by the implantation of the ovum within the uterine cavity. In cases, where the site of the ovum proved to be ectopic, this contraction of the uterine body is not obtained or is only very slightly marked. This early sign of ectopic implantation in the hands of one investigator proved of distinct value in 86.3 per cent of extrauterine pregnancies, where the adnexa did not show any intumescence. Another sign of importance is represented in a difference of uterine consistency. The uterine body in early intrauterine pregnancy (considerably softer and mainly in its lower segment) shows but little difference in consistency from the nonpregnant uterus in cases of early ectopic gestation. The nonpregnant, normal uterus is hard, and when compressed by bimanual palpation, it slides out from the touching fingers. If this harder consistency is associated with slight enlargement in a state of amenorrhea and there is some tender prominence in one of the tubes without rise of temperature, the case can be regarded as very suspicious of tubal pregnancy. This latter sign has been recorded in 62.8 per cent of all ectopic cases, which were confirmed by operation.

The implantation of the ovum in the interstitial portion of the tube approaches in symptoms and signs very close to normal pregnancy and presents sometimes more difficulties in diagnosis than a pregnancy farther out in the tube. In cases of interstitial gravidity, the erectility or the consistency of the uterine body does not differ strikingly from that observed in intrauterine gestation, also the intumescence of one of the tubal corners may be mistaken for that physiologic cornual distension described by Piscacek in the early stage of normal pregnancy. Yet there is one sign, important in the differentiation of interstitial from intrauterine gestation; namely, the usual elevation and backward rotation of the involved tubal corner in cases of interstitial implantation. This significant fact was ascertained in two cases of interstitial pregnancy, both being about ten weeks' old.

RELATIONS OF ECTOPIC PREGNANCY TO PATHOLOGIC CONDITIONS

Intrauterine Abortion.—A precise differentiation between tubal abortion and intrauterine abortion in the vast majority of cases is extremely difficult on a symptomatic or gross pathologic basis. The great clinical similarity of both conditions is generally appreciated. The more or less pronounced unilateral pain in the iliac region, and the tenderness of one or the other adnexa are not pathognomonic for tubal abortion, since it often occurs that in early intrauterine gestation a dormant adnexal inflammation becomes exacerbated, due to the active hyperemia of the pelvic organs. It is well known, that in ectopic gestation the endometrium becomes converted into a structure, which is similar to the decidua vera of normal pregnancy and differs from it only in a less marked development of the spongy layer. It usually is expelled in small fragments, imbedded in coagula, but occasionally is cast off intact, representing a triangular cast of the uterine cavity. The discharge of the decidual elements is of very little significance in the distinction of tubal from intrauterine abortion. Also, a higher leucocyte count may be present in both conditions, as well as higher temperature. The observation that the bloody uterine discharge accompanying tubal abortion does not show the normal tendency to coagulate, is of little diagnostic value, since also menstrual blood does not coagulate, and the hemorrhage present in the suspected case may represent only a normal, though delayed menstruation.

Considering this unreliability of clinical symptoms, it seems important to place more stress on the history, which actually proves one of the best guides in diagnosis. It must be briefly mentioned that ectopic pregnancy occurs mostly after the thirtieth year; that 89 per cent of the patients are multiparae, and that the average time since the last pregnancy is about three or four years. A very helpful hint is the observation, that an amenorrhea of six or seven weeks is followed by unilateral distress in the lower abdomen and by an irregular, scanty, "spotting" uterine hemorrhage in presence of a closed cervix. The previous history must be reviewed in order to eliminate the possibility of preexisting adnexal disease. If bimanual palpation does not reveal the enlargement of one of the adnexa, the erectility and consistency of the uterine body, as described above, may prove of value in making the diagnosis.

And lastly, attention should be called to the very important observation that in nearly all instances of suspected tubal abortion during

bimanual palpation, lifting and pressing of the uterine body toward the symphysis produces marked pain. This symptom is primarily due to the slow accumulation of coagulating blood in the culdesac. These coagula, being converted into fibrinous precipitations, form membranous adhesions between the posterior wall of the uterus and the rectum, causing pain on uterine motion. This well-marked tenderness, in the absence of fever and in the presence of menstrual irregularities, points distinctly to tubal abortion. It was ascertained in 78.4 per cent of all suspicious cases. It should help to prevent that reprehensible curettage, which unfortunately is so often made in doubtful cases, and is so likely to induce a tubal rupture with collapse; the latter then being diagnosed as a mere nervous reaction.

Adnexal Diseases.—There are still many cases, in which a peritubal hematoma is mistaken for an acute or exacerbated salpingo-oophoritis or parametritis. This type of erroneous diagnosis is quite common and often occurs if the diagnosis is based only on the bimanual examination and routine laboratory tests. It cannot be emphasized strongly enough, that a higher white cell count is usually present in cases of tubal abortion and is caused by absorption of extravasated blood, similar to the hyperleucocytosis seen after parenteral administration of proteins. The differential diagnosis is more dependent upon a correct interpretation of the history, the type of pain, and temperature curve. It is of importance to mention that the pain in tubal abortion is not constant but rather intermittent, appearing in paroxysms, and the temperature more likely subnormal or normal, only in very few cases showing a slight rise.

The value of the serologic test is obvious in the differentiation of inflammatory diseases from pregnancy, either intrauterine or ectopic. The Abderhalden test, recently modified by Luetttge and Mertz, shows an accuracy close to 98 per cent and is of great importance in the diagnostic dilemma often produced by a confusing clinical picture. The test shows a positive reaction also in the great majority of recently interrupted tubal pregnancies. The phloridzin-glycosuria test, on account of its very simple technic, is of great practical use. Its accuracy is close to 80 per cent, and it can be quickly made. In addition to these, the sedimentation test of the erythrocytes, inaugurated by Linzenmeier, in a large number of cases may help to solve the diagnostic problem, since the sedimentation time is nearly normal in the presence of tubal gestation, but markedly shortened in inflammatory conditions.

Appendicitis.—The actual and potential pathology of the appendix renders it a very important organ from the viewpoint of differential diagnosis. The typical manifestations of appendicitis are too well known to require quotation. For the sake of comparison with ectopic pregnancy, however, it must be emphasized that a positive diagnosis of appendicitis undeniably is often made on wholly insufficient grounds. The importance of McBurney's point is highly overestimated and too much stress is placed on temperature and blood count. In typical cases, however, the normally lying appendix gives distinct pain at McBurney's point, with a marked elevation of temperature and a rising white cell count, except in cases of gangrenous appendicitis, in which the two latter symptoms may be absent. The diagnosis of appendicitis under such circumstances is a simple matter and a differentiation from tubal abortion does not offer difficulties. However, there are a large number of cases, where the symptoms of appendicitis are not pathog-

nomonic of this disease. The maximum pain and tenderness in cases of an abnormally situated appendix are dependent on its position within the peritoneal cavity, and the symptoms may be so vague and confusing, that correct diagnosis encounters great difficulties. In reducing these possible difficulties some particular symptoms deserve consideration. One of the most valuable signs in appendiceal affection is represented in the transmitted pain, which appears in the appendix region on deep manual pressure applied to the *left* iliac fossa. This sign, first described by Rovsing, proved to be accurate in nearly 100 per cent of suspected appendix cases and can be explained by the mechanically created distention of the involved cecum and ascending colon, caused by a reflux of the intestinal contents. Another important sign of acute appendicitis is the skin sign described by Sherren, and recently discussed by Livingston. This skin sign is localized within a triangle; the upper limb of this extending from the navel to the uppermost point of the right iliac crest; the lower limb extending from the uppermost point of the right iliac crest to the right pubic spine, and the base of the triangle extending from the right pubic spine to the navel. Marked hyperalgesia of the skin obtained by a twisting pinch within this triangle, points to the presence of acute appendicitis. According to Livingston's statistics this sign proved to be positive in 84.9 per cent of acute appendicitis cases, and was negative only in cases of gangrenous or ruptured appendix. Lastly, there is an almost constantly present symptom in appendiceal involvement, which is characterized by a sudden and sharp pain in the right iliac region produced by the passive rotation of the patient's body. This latter sign is obtainable when the patient is sitting on the edge of the bed, bending the hip and knee joints in a right angle. Grasping both shoulders of the patient and rotating the body leftward, the patient notices a sharp pain in the right iliac region after slow rotation of 70 to 80 degrees. This symptom proved to be reliable in 98 per cent and was never present in adnexal disturbances, except in those few instances, where the appendix was found to be adherent to the primarily diseased adnexa.

Considering these observations, the exclusion of an appendiceal process can be safely made by these signs in nearly all doubtful cases. After exclusion of an appendiceal involvement, the differential diagnosis between inflammatory adnexal disease and suspected ectopic pregnancy can be made by means of the suggestions described above.

Affections of the Sigmoid Colon.—Among the primary diseases of the sigmoid colon the diverticulitis has importance in regard to the differential diagnosis of ectopic pregnancy. The occurrence of sigmoidal diverticulitis is comparatively rare, but its possible presence merits consideration in doubtful cases. In a case of tubal abortion complicated with a diverticulitis of the sigmoid colon (quoted here) this combination gave rise to considerable diagnostic difficulties.

A multipara, thirty-four years old, was seized with intense pains in the left iliac region after having suffered from similar but less pronounced pain-attacks in the same region for the past two years. Last menstruation occurred seven weeks previous to this attack. Last partus was four years ago. For twelve hours slight uterine hemorrhage with periodic sharp pains in the left lower abdomen, appeared in paroxysms.

Bimanual examination revealed a somewhat larger uterus in anteversion, without noticeable changes of its erectility and consistency. Both tubal corners were at the same level, and there was no torsion of the uterine body. Right adnexa were normal. The palpation of the left adnexa caused great difficulties. They seemed to be

imbedded in a soft mass, which extended from the left sacro-uterine ligament to the left ala ossis ilium. They were slightly movable, and there was sharp pain caused by pressure and lifting. Also, a sharp pain of the same intensity was noticed by the patient in the left iliac region on deep manual pressure applied to the cecal region. Temperature: 99° F. Pulse: 96. Leucocytes: 9200. Sedimentation speed of erythrocytes very slightly increased.

In this case the nearly normal erectility and consistency of the uterine body, the pain on lifting of the uterus and of the mass, the periodic and paroxysmal nature of pains, the absence of torsion of the uterine body, the nearly normal temperature, leucocyte count, and sedimentation speed of the red corpuscles, and the history of amenorrhea followed by a slight uterine hemorrhage now present in a patient thirty-four years of age, four years after her last partus, pointed to the possibility of tubal abortion. This supposition seemed erroneous after an oil enema, the repeated bimanual palpation showing now a mass considerably smaller and more movable than before. The careful lifting and forward traction of this small mass now caused a distinct pain in the whole left flank of the abdomen. This latter sign and the previously observed pain in the left iliac region on manual pressure to the cecal region, also the history of having had these iliac pains for about two years, did not permit our ignoring the possible presence of a diverticulitis of the sigmoid colon. So the clinical picture became confusing and for this reason a phloridzin-glycosuria test was made. This showed a distinctly positive reaction.

The operation confirmed both tentative diagnoses. A left tubal pregnancy was found with a small peritubal hematoma, corresponding in size to the mass found by the repeated bimanual palpation. The ampullar portion of the left tube was firmly suspended on the ascending limb of the sigmoid colon by perisigmoidal adhesions, the sigmoid colon showing on this place a considerable redundancy with thickened walls. After releasing the adhesions the left adnexa were removed.

The tissue examination confirmed the tubal pregnancy; the mucous and muscular coat of the tube proved to be free from any inflammatory changes. The sigmoid diverticulitis could be regarded as the primary lesion, involving the ampullar portion of the left tube, kinking the lumen of the latter and causing an ectopic implantation of the ovum.

This case demonstrates the great importance of the history, and the value of certain differential diagnostic measures even in such an obscure and rare case, which if not operated on, would possibly have terminated fatally. Many of the symptoms presented could have been interpreted simply as due to a perisigmoiditis or a simple, exacerbated adnexal inflammation.

Tumors.—The differential diagnosis of ectopic pregnancy from tumors, or the diagnosis of extrauterine gestation in presence of adnexal masses, either inflammatory or not inflammatory, offers in the majority of cases great difficulties. The bimanual palpation leads very often to errors, since an inflammatory tumor of the adnexa often does not cause pain, or higher temperature, and evidences its pathology mainly in the form of irregular menstrual periods. On the other hand, noninflammatory adnexal tumors may be extremely tender on palpation, also immovable and not sharply circumscribed. In some instances the tumor being impacted in the culdesac, causes a considerable venous hyperemia of the vulva, imitating the lividity observed in early pregnancies, and the differential diagnosis in such cases based upon bimanual palpation becomes practically impossible, when the symptoms are overshadowed by menstrual irregularities.

It is worthy of mention, that in rare instances hematosalpinx can be observed without evidence of a concomitant hematometra. Such hematoma may develop in cases of extreme cervical stenosis associated with subacute or exacerbated adnexal inflammation. The inflammatory process produces more or less relaxation of the tubal wall, and during the menstrual period the uterine contractions press a considerable amount of blood into the tube. The menstrual flow in these cases then is delayed and becomes irregular. In these rare cases the symptoms of

tubal abortion dominate in the picture and completely obscure the underlying disease of the adnexa.

For this reason the history deserves most careful study and interpretation. Of great importance also is resort to all pregnancy tests. It must again be emphasized in this connection, that the pain in a tubal abortion is usually intermittent. Specific serologic tests or the simple glycosuria test may clear up the diagnosis in many instances, even when the bimanual examination and routine tests give no help.

Ovarian Hemorrhage.—The rupture of small ovarian cysts or of follicles may occasionally produce more or less marked accumulation of blood in the vicinity of the adnexa, simulating a peritubal hematoma. According to Phaneuf, there were only 62 true cases of ovarian hemorrhages recorded in the literature of the past twenty-five years, showing a perfect mimicry of tubal abortion. The onset of symptoms in these cases is sudden and they usually appear six to eight days before the expected menstruation. This observation, however, is of little value in determining the nature of the affection, since tubal abortion may also occur at the same period of time. The symptoms of ovarian hemorrhage may resemble acute appendicitis, but the differentiation from this latter affection can be made in nearly all cases by those infallible signs already described in the discussion of appendicitis.

A careful interpretation of the previous history and the various pregnancy tests prove of high value in such cases. According to several writers an intraperitoneal hemorrhage, excepting tubal abortion or tubal rupture, occurs only in cases of hemorrhagic diathesis or of pedicle twist of ovarian cysts.

Parametritis.—The symptoms of acute parametritis rarely create a problem in the differential diagnosis, from ectopic pregnancy. This is so even in cases where the unilateral exudate extends to the kidney region, simulating a retroperitoneal blood accumulation following intra-ligamentous tubal rupture, because high temperature and chills are usual in parametric affections. The high leucocyte count is of little significance, since in many cases of tubal abortion a hyperleucocytosis as high as 18-20,000 can be observed. Tubal pregnancy, if associated with chronic or exacerbated parametritis, may offer extreme difficulties of diagnosis. A carefully performed serologic test or phloridzin test is often the only reliable guide in the differentiation. The early diagnosis of this complication is quite imperative, otherwise the still sterile hematoma may become infected and suppurate, presenting then the typical clinical picture of a culdesac abscess and inevitably obscuring the imminent danger of a severe hemorrhage from the tube. In such a situation it is difficult to determine the type of required operation, for the posterior kolpotomy may lead to an unexpected intraperitoneal hemorrhage while, on the other hand, the abdominal operation in presence of a sacculated pelvic abscess is very hazardous.

RÉLATIONS OF TUBAL RUPTURE TO ACUTE ABDOMINAL AFFECTIONS

Under ordinary circumstances there is probably nothing more typical than a recently ruptured ectopic pregnancy. The sudden occurrence of a more or less intense, lancinating pain in the lower abdomen followed by nausea or vomiting, the gradually increasing paleness of the skin and especially of the visible mucous membranes, the faintness and disturbance of vision, the beaded perspiration on the forehead and cold extremities, the rapid and thready pulse in the presence of a bog-

giness or well-marked mass in the culdesac with a previous history of suppressed menstruation are infallible signs.

The premonitory symptoms and clinical manifestations, however, in many cases of ruptured ectopic pregnancy are far from being so well pronounced as was outlined above. These cases, presenting a more or less defective clinical picture, offer great diagnostic difficulty and often give rise to hesitation concerning surgical intervention. Unfortunately, many of these cases terminate fatally on account of diagnostic errors.

Among the acute abdominal diseases, which may lead to errors in the differentiation from ruptured ectopic gestation, the perforated gastric ulcer, acute appendicitis, acute inflammations of adnexa, torsion of ovarian cyst, ovarian hemorrhage, and acute intestinal obstruction are first to be taken into careful consideration.

Perforated Gastric Ulcer.—The clinical picture of this condition shows in many cases much similarity to tubal rupture. The proper diagnosis of a perforated stomach is in many respects dependent on a correct interpretation of the history of preexisting gastric disease. But the differential diagnosis becomes extremely difficult in those cases of tubal rupture, where the history reveals preceding gastric disorders, and bimanual palpation at that time does not reveal any characteristic changes in the internal genitals. For this reason some of the more striking symptoms deserve careful consideration in regard to distinguishing features of these affections.

The sudden onset of the ulcer perforation is accompanied by a very intense epigastric pain, which often radiates to the shoulders. In cases of tubal rupture the well-known hypogastric pain is also often followed by distress in the scapular region. This radiation of pains is in both conditions produced by the same cause; i.e., by the accumulation of a foreign substance, of gastric contents and liquid blood respectively, in the subphrenic space. The intensity of this radiating pain is greatly dependent on the patient's position and is less pronounced in Fowler position. Therefore, this phrenic symptom by itself is of little diagnostic aid. Also, paleness of the visible mucous membranes, tormenting thirst, dull percussion of both abdominal flanks and marked leucocytosis may be present in either condition. The often claimed differential diagnostic value of the boggy mass and distinct tenderness of the culdesac in ectopic pregnancy is of little help, since this symptom is very often present also in cases of gastric perforation, and is caused by the descension of stomach contents, which slide down over the small intestine and accumulate in the pelvis, leading there to a marked irritation. The exploratory puncture of a boggy mass in the culdesac should be avoided. The needle may pierce a distended loop of the small intestine and the aspirated yellowish chymus may be mistaken for purulent matter, confusing still more the clinical symptoms or causing a fatal lesion of the bowels.

To eliminate the chief obscuring factors, it is necessary to determine at once, whether collapse and paleness are due to an unequal distribution of the blood in the vascular system, as observed in nervous shock, or to a sudden loss of blood. The marked diminution of the erythrocytes and the considerable decrease of the hemoglobin percentage point to the presence of intraperitoneal hemorrhage, and the possibility of a vasomotoric disturbance can be ignored. Of great importance also is the condition of the abdominal wall, which in cases of stomach per-

foration is extremely rigid and tender in the epigastrium, accompanied very often by distention and tympany. In tubal rupture this rigidity and distention is only slightly marked or may be entirely absent, while the tenderness is comparatively much more pronounced. The frequently observed tenesmus of the urinary bladder in ruptured ectopic cases may be also observed in stomach perforation, although its early appearance indicates rather blood extravasation in the pelvis and points to tubal rupture. Anuria may be observed in cases of tubal rupture, being almost characteristic of this condition, but anuria may as well be present in a gastric perforation. The anuria after tubal rupture, however, is due to the persistent anemia, while the anuria in ulcer perforation is merely caused by a reflexory sphincter spasm and its nature is readily distinguished by catheterization, which reveals a full bladder. With observance of these differential diagnostic signs and measures, errors in diagnosis may be considerably reduced. In cases which present a less fulminating clinical picture, a quickly performed serologic pregnancy test may be of great help.

Acute Appendicitis.—In some instances tubal rupture simulates the well-known symptoms of acute appendicitis. Most confusing may prove the localization of pain and a more or less marked collapse followed by nausea or vomiting. A careful examination of the skin sensitiveness and Rovsing's sign, the red blood cell count and hemoglobin determination are of eminent diagnostic value. Since the leftward rotation of the patient's shoulders in a sitting position, for ascertaining the diagnosis of appendicitis, is usually impossible on account of the patient's general condition, this test, described above, may be replaced by the one advocated by Soresi. Soresi's test consists in slight pressure applied to the hepatic flexure of the colon, while the patient is asked to cough. In cases of acute appendicitis a distinct pain appears in the appendiceal region, being caused by the stretching of the distended colon and by the increased intraabdominal pressure. This sign proved to be very valuable in many doubtful cases, where the differentiation between adnexal and appendiceal affection was impossible by means of the usual methods.

Acute Adnexal Affections.—These conditions often offer difficult differential diagnostic problems, especially when the inflammatory symptoms are accompanied by menstrual disorders. The inflammatory tumor is often soft and not well circumscribed, thus simulating the resistance observed in cases of peritubal or retrouterine hematoma. On the other hand, tubal rupture not rarely is accompanied by a marked leucocytosis and elevation of temperature, obscuring the emergency nature of the case. The fact, that the pain in ruptured ectopic pregnancies frequently follows a definite course, is a great aid in the diagnosis. The pain radiates from the lower abdomen to the loin and back, the sensory fibers carrying the irritation along the course of the internal spermatic vessels into the centers. In all doubtful cases, where the symptoms are not so alarming, the serologic or glycosuria test should be made and the diagnosis of the inflammatory nature of the affection confirmed by the erythrocyte sedimentation test.

Torsion of Ovarian Cyst.—The most important diagnostic measure in this condition consists in an immediate blood count, to settle first the question of an intraperitoneal hemorrhage. Torsion might, however, be accompanied by considerable blood extravasation into the culdesac. In such cases the symptoms are so similar to tubal rupture,

that the exact clinical diagnosis becomes practically impossible. But exact differential diagnosis in these instances is of little practical importance, since both conditions require immediate surgical interference. Occasionally the affected cyst becomes impacted in Douglas' pouch, causing there a marked prominence palpable by vaginal examination. In such cases exploratory puncture of the posterior fornix confirms the diagnosis. It must be strongly emphasized here that one encounters also cases of tubal rupture with a preexisting ovarian cyst, the latter lying in the posterior culdesac. Under such conditions a sudden tubal rupture may simulate torsion of the cyst. An exploratory puncture here may lead to grave error in disclosing the cyst but fail to reveal the possibly imminent danger of a fatal hemorrhage from the pregnant tube. The following case may serve as a good illustration:

A multipara, thirty-two years of age, collapsed suddenly in the early morning hours while doing her daily housework. On admission to the hospital the patient, who was nauseated, showed a very anxious expression with great paleness of the skin and of visible mucous membranes. The pulse was rapid, thready and at times scarcely perceptible. There was no history of menstrual irregularities, or of amenorrhea. Last menstruation was twenty days before admission. The previous history revealed the presence of an ovarian cyst, for which the patient had consulted several surgeons, all of whom advised operation.

The patient complained of a drawing pain in the lower abdomen, which was very tender on palpation, but did not show marked rigidity. The bimanual examination revealed a smooth, well circumscribed and firm resistance in the posterior fornix, which was extremely tender on palpation. The mass occupied a considerable portion of the culdesac and extended more to the left. The closed cervix was pressed by this tumor toward the symphysis. An exact palpation of the uterine body and adnexa was impossible on account of great tenderness.

Temperature: 99.4° F. Pulse: 130. Erythrocytes: 3,150,000. Leucocytes: 14,400. Hemoglobin: 58 per cent. Polymorphonuclears: 77 per cent. Urine: negative.

The clinical picture and all signs pointed to the presence of an intraperitoneal hemorrhage due either to tubal rupture or to torsion of an ovarian cyst, although the rigidity of the abdomen was too slight for the latter supposition. To ascertain the diagnosis, an exploratory puncture of the firm mass was made, and a clear, seromucous fluid aspirated. This result seemed to speak against the supposed intraperitoneal hemorrhage; but, on the other hand, the clinical signs and especially the blood count were so striking, that the possibility of a blood extravasation could not be abandoned. For this reason the puncture was repeated and the needle introduced somewhat deeper and more to the right into the culdesac, resulting in the aspiration of bright red blood.

The immediately performed laparotomy revealed a ruptured right tubal pregnancy with large retrouterine hematoma. In this hematoma was imbedded a multilocular left ovarian cyst, the size of a grapefruit. After left salpingo-oophorectomy, right salpingectomy and proper after treatment the patient made an uneventful recovery.

This case illustrates how symptoms arising from a less important affection may overshadow another which is of vital importance, and how easily a coexisting affection may be mistaken for the sole cause of all the symptoms, if available differential diagnostic measures are not properly used.

Ovarian Hemorrhage.—As stated above, the occurrence of true ovarian hemorrhage, causing severe loss of blood, is rare. According to several authors, this affection is caused either by hemorrhagic diathesis or by pedicle torsion of ovarian cysts and, if accompanied by severe intraperitoneal hemorrhage, shows a perfect mimicry of tubal rupture. The differential diagnosis, however, is unimportant since instant abdominal section is imperative in either case.

Acute Intestinal Obstruction.—There are a few cases of ruptured ectopic gestation without a history of menstrual irregularity, which

simulate both the mechanical and dynamic (spastic) type of ileus. The sudden onset without premonitory symptoms, the collapse, paleness, rapid pulse, vomiting, meteorismus and paroxysmal, periodic pains may be present in intestinal obstruction as well as in cases of tubal rupture.

Spasmodic contractions of the bowels, caused by the irritating effect of extravasated blood and resulting in dynamic ileus, are often observed in cases of tubal rupture. These symptoms may be so pronounced, that they obscure the underlying affection. Colicky pains appear at short intervals, peristaltic waves trail across the abdomen, distinct borborygmus and splashing sounds are obtainable by auscultation and percussion of the abdomen. When the clinical picture in such a case does not include a well-marked pallidity and a rapid, weak pulse, a wrong diagnosis of intestinal obstruction might be made and could become responsible for the fatal outcome. A hypodermic injection of 1 mg. of atropine and the blood count will be of eminent importance in the differential diagnosis. This will help in establishing the diagnosis early and one should never wait for the appearance of indican in the urine or for "fecal" vomiting. On the other hand, one should not delay diagnosis until the subicteric discoloration of the sclera becomes manifest or until a bluish discoloration of the skin about the umbilicus is noted, as described by Cullen in intraperitoneal hemorrhage, since this latter sign appears only in patients with thin abdominal walls or with an umbilical hernia. Its absence certainly does not exclude tubal rupture even with severe loss of blood.

To recapitulate: It is evident that the diagnosis of extrauterine pregnancy is in a larger number of cases very difficult. The diagnosis must rest on the combination of several prominent symptoms and it is hazardous to depend on one or two, more or less marked signs. The great importance of an exact and quick laboratory technic, and the eminent value of all differential diagnostic symptoms are unquestionable.

The first positive diagnosis of an uninterrupted tubal pregnancy was made by Veit, in 1883; in this country by Janvrin, in 1888. Many years passed before the early diagnosis became a more frequent occurrence. With the improvement of our information and with the increasing reliability of the various differential diagnostic tests and symptoms, the number of unrecognized ectopic pregnancies should soon be reduced to a negligible minimum.

KING HILL BUILDING.

Selected Abstracts

Anesthesia in Labor

Danforth, W. C.: *Obstetric Anesthesia and Analgesia*. The Wisconsin Medical Journal, 1924, xxiii, 175.

Chloroform and ether are deficient in that they cause too much interference with the force and frequency of uterine contractions and so are usually given only at the end of the second stage. Chloroform has today no place in obstetrics.

In the first stage of labor inhalation of anesthetics is of little value. Small doses of opiates, preferably pantopon or morphine alone, or supplemented by scopolamine, are used. In the second stage nitrous oxide combined with oxygen has the preference because it is less toxic and does not slow the progress of labor. For delivery of the head ether is added.

A summary of a series of 1323 cases shows 59 infant deaths, of which 22 were premature babies, born before the eighth month; 20 from uncontrollable causes, and the remaining 17 were obstetric deaths, each death adequately accounted for on some basis other than anesthesia. Eleven hundred and sixty-five of these cases were delivered either spontaneously or with low forceps. The maternal mortality rate was 0.37 per cent, none of which can be charged to gas anesthesia.

Gas anesthesia lessens postpartum bleeding and manual removal of placenta is much less often needed. It can be used in practically all obstetric operations. It should be replaced by ether in version, manual rotation of the head in persistent occiput posterior, and breech deliveries, particularly in primiparae.

F. J. SOUBA.

Van Hasselt: *Analgesia in Labor*. *Nederlandsch Tijdschrift voor Geneeskunde*, 1925, i, 1207.

In 1897, Fliess proposed treating certain forms of dysmenorrhea by cocaineizing certain areas of the nasal mucosa on the assumption that these "genital spots" had some reflex connection with the genitalia. Upon this basis, van Hasselt conceived the idea of placing wads of cotton saturated with 66 per cent chloroform in olive oil into the nostrils of women in labor. Whenever the patient has a pain, several drops of the mixture are dropped on the cotton. In this way an average of 15 c.c. of the mixture is used during labor.

While he admits that suggestion may play a large part, he found that the women were "well satisfied" with the method and most of them claimed a marked diminution of the pains while the contractions were in no way influenced.

R. E. WOBUS.

Koster: *Analgesia in Labor by Means of Hypnosis*. *Nederlandsch Tijdschrift voor Geneeskunde*, 1925, i, 2657.

Agreeing with van Hasselt that women in labor are especially amenable to suggestion, Koster feels they may also be unusually susceptible to narcosis and, in this way, may actually become analgesic from relatively small amounts of chloroform. He feels that the relationship of nasal ganglions and the genital apparatus has not been proved and is highly improbable.

Koster makes a plea for "the only absolutely safe method" of diminishing pain in labor; namely, hypnosis. He has used it with universal success, though he admits

most women dread it more or less, feeling that undue advantage may be taken of them while under hypnosis. Most of his patients refused to have hypnosis used in subsequent labors.

R. E. WOBUS.

Franke: *Labor under Hypnosis for the Clinical Physician.* Deutsche medizinische Wochenschrift., 1923, xlix, 1341.

The degree of practical knowledge of hypnosis needed for use in labor can be easily acquired. The patient is seen four or five times before labor for hypnotic treatments lasting one-quarter to one-half hour at intervals of two days. The patient goes about her daily duties after it without any trouble.

When labor begins the patient should be in familiar surroundings, as a strange environment and especially the presence of skeptical people are hindrances. The hypnotizer must begin as soon as the pains start and at least while there is time enough between pains to accomplish his object. With a good technic the patient will go to sleep spontaneously with the beginning of labor. The hypnotizer as a rule must remain with or near the patient until the end of labor, but if the pains are mild or the patient a good subject, he might be able to leave for two or even four hours. If the patient wakes up during the absence of the physician, it is uncertain whether or not she can be put to sleep again. It is unlikely that the parturient woman will sleep for several hours or through the whole labor without danger of a spontaneous awakening. Up to the present he had to give new suggestion as labor progressed and in greater amount the longer labor lasts. The patient rarely lies so still that the pains are only noted by feeling the abdomen. Usually she is as restless as any other patient although she feels no pain.

There have been but few reports of satisfactory delivery during hypnosis. Conditions are more favorable in a private hospital. The difficulty as regards strange surroundings can be overcome by having the patient enter before labor begins. The physician who gave the preliminary treatments need not necessarily be the one to give the hypnosis during labor.

FRANK A. PEMBERTON.

Riss: *Obstetrical Analgesia Produced by Somnifène.* Bulletin de la Société d'Obstétrique et de Gynécologie, 1924, xiii, 417.

The new analgesic drug, somnifène, was tried by Riss on 40 women, and was given both intramuscularly and intravenously in 6 c.c. and 4 c.c. doses respectively. About fifteen to twenty minutes after an intramuscular injection, the patient becomes progressively more drowsy. However, with each uterine contraction there is extreme agitation, almost convulsive in nature, making any kind of examination impossible. Force must be used to prevent the patient from falling off the bed. After each contraction the patient becomes sleepy again. Forceps delivery in these patients without the use of a general anesthetic is out of the question. After delivery the women usually have no recollection of having suffered, but this result is not constant.

When the drug is given intravenously the action is much more rapid and very few women remember of having suffered. Labor seemed accelerated in the first stage but retarded in the second, because the patients could not use their abdominal muscles. Some of the deliveries were bloody. The fetus does not seem to suffer from the drug. No mother was injured and nearly all slept for a number of hours after delivery.

The author concludes that somnifène is not toxic in the doses employed, that its analgesic action is undeniable, but not constant. Its action is more certain when given intravenously. Because of the violent agitation, patients receiving this drug should be in a hospital and under careful supervision. J. P. GREENHILL.

Dujol and Clément: Obstetrical Anesthesia Produced by Somnifène. *Bulletin de la Société d'Obstétrique et de Gynécologie*, 1924, xiii, 461.

Somnifène was first used by Bardet as a surgical anesthetic, and by Ceiné and Cleisz and Perlis as an obstetric analgesic (1923).

Somnifène was used on 30 parturient women by Dujol and Clément. The first 12 of these received intramuscular injections and the latter 18 intravenous injections. The drug appeared to suppress the pains of labor very well and also the mental perception of the contraction. It acted, therefore, more as an anesthetic than as an analgesic. Because the patients appeared very toxic while under the influence of the drug, the latter should not be employed by general practitioners—and constant supervision by a physician is imperative. The drug should be used only in hospitals and in cases where labor is prolonged and very painful.

J. P. GREENHILL.

Delmas, P., and Roume, A.: Obstetrical Anesthesia by Means of the Ureic Compounds. *Presse Médicale*, Paris, Sept. 2, 1925, p. 1171.

The authors employed somnifène (a salt of barbituric acid and of diethylamine) in twelve obstetric cases, in addition to five cases previously reported by one of them. Their results were unsatisfactory; complete arrest of labor for many hours was noted in some instances. The majority of the parturient women became violent and almost uncontrollable; the percentage of instrumental delivery was increased, and the babies were somewhat somnolent and refused to nurse for two or three days. The patients, as a rule, were also drowsy for a couple of days after delivery, at the end of which time they had no recollection of the labor. Similar results were obtained with allonal (phenyl barbiturate of amidopyrine). In therapeutic doses, somnifène so far has not proved fatal to mother or baby. The authors suggest that it may have a field in long and tedious labors, when its use is supervised by an expert, and also that it may be employed in a synergistic manner.

The rectal administration is preferred to the intravenous route which has been recommended by some, as the authors claim that the latter method in some instances produced a state of shock. The drug may be administered intramuscularly. As patients in labor are prone to vomit, oral administration is not feasible. It is given in doses of 5 c.c. intramuscularly or 10 c.c. per rectum, diluted with water or normal salt solution.

E. L. KING.

Manna, A.: Clinical Study of a New Analgesic in Obstetric and Gynecologic Practice. *Archivio di ostetricia e ginecologia*, 1923, xvii, 145.

This report deals with surgical anesthesia induced by maratrik, a composition of morphine hydrochlorate 10 mg., neutral atropine sulphate 15 mg., sedasine Gualdoni (benzoic ether of dimethylaminopropinol) 2 mg., and is marketed in ampules of 1 and 2 c.c. of sterilized substance for one injection.

With the patient in lithotomy position, the region of the tuber ischii is disinfected with tincture of iodine and maratrik injected, one centimeter interior and anterior to the tuberosity, seeking to carry it into proximity of the pudendal nerve. The tip of the needle is guided by means of the sterile gloved fingers of the operator's free hand, the middle finger seeking the pulsation of the pudendal artery accompanying the nerve, while the other finger (the index) guides the needle point more or less directly.

Maratrik was used in 17 cases in labor, all in good condition, with normal pelves, and without previous obstetric disasters. It was given when dilatation was from 5 or 6 cm. to complete. Analgesia was in all cases complete, or the pains at least rendered bearable. Uterine contractions were somewhat shortened and inter-

vals lengthened. No general reaction was observed, and there was practically no effect on the baby. The third stage was spontaneous in all cases and without excessive loss of blood.

It was also used in three gynecologic cases with good results.

THOS. R. GOETHALS.

Heaney, N. Sproat: Ethylene in Obstetrics. *Journal of American Medical Association*, 1924, lxxxiii, 2061.

Ethylene and oxygen were used 215 times in normal labor and in operative obstetrics. The results can be called excellent. Every obstetric operation including cesarean sections could be performed without additional ether. The advantages of ethylene are: better relaxation, speedy analgesia, absence of cyanosis, rapid return of consciousness, and slight postoperative complaints. Ethylene is of particular advantage in cases where ether and chloroform are contraindicated. It was also used extensively for the conduct of normal labor. When used over a greater length of time, as in labor, there is a greater chance for the occurrence of explosions. Among 30,000 administrations in the hospital two explosions were encountered. Uterine hemorrhage was slightly greater than with nitrous oxide, but far less than with ether.

GROVER LIESE.

Vandesial, R.: Spinal Anesthesia in Obstetrics. *Bruxelles Medical*, 1925, xxv, 845.

Vandesial feels that there is little justification for obstetricians to continue in ignoring spinal anesthesia for certain cases, after the results obtained by Bundeau with this procedure.

Indications for its use may be classified as follows: (a) when in the course of a prolonged labor a period of one to two hours' rest is desired; (b) where it is necessary to obtain anesthesia of the genital regions, as with rigid perineums or when forceps or breech extractions are indicated; (c) in cases where digital dilatation of the cervix is to be carried out, and (d) where pubiotomy or cesarean section is indicated. In cesarean section this type of anesthesia is preferable to a general anesthetic because hemorrhage and shock are lessened.

Vandesial uses $\frac{3}{4}$ c.c. of a 10 per cent stovain solution. The injection is made below the fourth and fifth lumbar vertebra. Anesthetic action is immediate and lasts for at least one hour.

THEODORE W. ADAMS.

Lin, Margaret H. D.: Twilight Sleep in China. *The National Medical Journal of China*, 1924, x, 377.

The author states that in seven years of practice in Foochow and Shanghai she has used twilight sleep in one-fourth of all her obstetric cases with absolutely good results. She makes a plea for its more general use as a means of relieving suffering during labor.

F. L. ADAIR.

Baumann: Death from Scopolamine. *Zentralblatt für Chirurgie*, 1924, li, 223.

A woman, fifty-two years of age, in good general health, was subjected to hemorrhoidectomy. Preliminary to the operation she received in two doses a total of 2.6 cg. pantopon and 0.4 mg. scopolamine. The operation was performed under local anesthesia in which a total of 0.3 gm. novocaine was used. Two hours after the operation, breathing became slower, but the pulse remained good. Cyanosis was marked. Under artificial respiration, the patient recovered after an hour. Three hours later breathing again became shallow and the patient died despite all efforts. Autopsy revealed no organic changes.

Baumann dismisses the possibility that the novocaine may have been a factor. Had it been injected intravenously, symptoms of poisoning should have manifested

themselves immediately. Besides, novocaine paralyzes the heart, while breathing remains unimpaired.

In addition to this case, Baumann recites two cases in which the cause of death soon after operation was probably due to scopolamine; however, these patients had been subjected to gall bladder operations under ether narcosis, so that these may have been contributing factors. These patients also were elderly women. He continues to use the drug, though more guardedly. (Some clinics, notably Braun's, have discontinued the use of scopolamine on account of unpleasant experiences.)

R. E. WOBUS.

Harrar: Rectal Ether Analgesia in Childbirth. American Journal of Medical Sciences, 1925, clxx, 256.

Harrar is satisfied with the results obtained in 200 trials in the past two years with magnesium sulphate-morphine injections combined with rectal instillations of a mixture of quinine, ether, alcohol, and olive oil. He describes in detail the method and warns against its application too early in labor, that is, before the defacement of the cervix, with two fingers dilatation of the external os, and contractions coming every three to five minutes and with labor pains sufficiently hard to cause complaint by the patient. There are certain occasional annoyances, such as soiling of the field with liquid fecal matter, nausea, or burning sensation in the anal region. He uses vaseline liberally over the parts to prevent scalding of the skin in case the ether should be expelled. Occasionally the morphine and magnesium sulphate will stop labor, but the method is reemployed when labor starts again. He warns against the use of chloroform when the method has been used, but there is no objection to gas inhalation as an aid to delivery under narcosis. This is not required in a large percentage of the cases nor is it necessary to give anything additional for perineal repair. The method is used in about 70 per cent of their hospital cases and is also employed in the out-patient department. He states that the method can be as satisfactorily carried out in the home as in the hospital. In summarizing he says "that this method of analgesia does not carry the woman entirely out of the valley of her suffering, but it is of real value in that it abolishes the most dreadful part of the ordeal of labor in almost all cases, that it is without danger to either the mother or her baby, and that in painstaking hands by strictly adhering to the described analgesia, its occasional annoyances may be avoided."

W. KERWIN.

The American Journal of Obstetrics and Gynecology

VOL. XI

ST. LOUIS, APRIL, 1926

No. 4

Original Communications

THE RADIUM TREATMENT OF CARCINOMA UTERI*

BY GEORGE GRAY WARD, M.D., AND LILLIAN K. P. FARRAR, M.D.
NEW YORK CITY

(From the Clinic of the Woman's Hospital)

THE grave menace of carcinoma looms largely at the present time in the public mind, because of the publicity given to the intensive research work carried out all over the world in an endeavor to combat this terrible scourge. We are all looking forward with hope that this plague, which so ruthlessly attacks all classes and nearly all ages, shall at last be conquered, as have some of the other death-dealing diseases, by a remedy practical in application and certain in reaching the deep-seated manifestations of this disease. Until that Utopian remedy is obtained, it is our duty to use to the utmost those means which long years of study and experience have shown to be the best available at the present time: namely, surgery and irradiation.

Statistics show that in the United States there are probably 300,000 people suffering from cancer at the present time. Cancer must be regarded as the most frequent independent cause of death in adult life; the death rate is increasing each year, and at present stands at the high figure of 89.4 per 100,000. The cancer occurred in the female genital organs, exclusive of the breast, in 14.14 per cent of these cases.

Whether the microbic origin of cancer is proved or not, or whether it be a "specific growth process," as believed by Blair Bell, there will be a long period of waiting before demonstrable proof can be had of the value of antimicrobial inoculations or intravenous metallic therapy. Radical surgery for carcinoma has probably reached the limits of per-

*Read by invitation before the Philadelphia Obstetrical Society on December 3, 1925.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

fection, and we know with a fair degree of accuracy, from many years of observation, what percentage of apparent cures we may hope for in the cases that have sought relief early. The full value of irradiation, whether by radium or roentgen rays is still an open question, except that it is generally agreed that in advanced cancer of the cervix, radium is by far the most valuable palliative measure at our disposal at the present time. It behooves us then diligently to continue the study of end-results in cancer cases in order that we may contribute little by little to our knowledge of the most efficient methods of applying these remedies, and we should be encouraged to do this because a study of the available statistics of various clinics shows that there has been a steady improvement in the results obtained as a better understanding of irradiation has been developed.

CLASSIFICATION

One of the first essentials to a better understanding of end-results is the adoption by all clinics of a uniform system of classification of cervical carcinoma, of which simplicity is a necessary feature. Schmitz's classification seems to us to recommend itself on this ground, and we have adopted it in our clinic with slight modification in the interest of clarity as follows:

Primary Cases, those receiving initial treatment from us, are divided into four classes. In Classes I and II the disease is macroscopically limited to the cervix; in Class III the disease has extended beyond the cervix either in the broad or uterosacral ligaments or vagina, including the borderline cases; in Class IV are the advanced cases with extensive involvement of the tissues of the pelvis or abdomen, the so-called "frozen" pelvis.

Secondary Cases are those recurring after hysterectomy for cancer of the cervix.

We have preferred the term "secondary" to "recurrent," believing it would be less confusing to confine the term "recurrent" to any renewed activity of the malignancy, whether after operation or radium therapy.

Unless we have some uniform system of classification, a comparative study of results in the various clinics must always be difficult and inaccurate. As a result of this lack of uniformity any comparative figures we may have today are largely speculative. Again we should agree on what we mean when we speak of a "cure." In many of the reports the term "absolute cure" is used and is based on the generally accepted five year limit. Personally we believe that the "five year cure" is only a relative term, and we take it that when the term "free from symptoms" is employed it is meant subjectively, as objectively we cannot say in many of these cases that the infiltration or thickening that may still be palpable in the pelvis in symptomatically cured patients does not contain cancer cells capable of extending the disease. Fur-

thermore, we know of patients who have long passed the five year mark free from symptoms and apparently cured, who have subsequently died of cancer.

FOLLOW-UP

We believe a follow-up that is conducted by the surgeon himself is of far greater accuracy and therefore of more value in drawing conclusions than is the follow-up by letter from either the patient herself or from her family physician. Undoubtedly, the most perfect follow-up for carcinoma cases is that conducted in Sweden, as these patients are under government control, the government paying the necessary transportation expenses, etc. Heyman, of Stockholm, was able to report at the American College of Surgeons in 1924 a 100 per cent follow-up of cases. We realize that this is a very difficult problem in our large cities with their shifting population, yet we believe that a great improvement can be made in spite of the handicaps, if serious intensive efforts commensurate with its importance are brought to bear upon this phase of the subject. This is to be accomplished by proper organization and more funds for the Social Service Department.

We have found that the fact that the patient realizes that she will be seen and examined personally by the surgeon who operated upon her and who therefore, from her viewpoint, has a personal interest in following the progress of her case, will insure a high percentage of returns. One difficulty results from the patient's not realizing the serious nature of her disease, and when she has no subjective symptoms there is danger of her neglecting to continue to report to the follow-up. It is not our custom to tell these women that they have cancer if we can avoid it, but it is important that their next of kin should be promptly and fully informed of the character of the disease, the probable outcome, and the urgent necessity for regular observation in order that their influence may be exerted to this end. In our recent report,¹ presented before the American Medical Association last May, we were able to show a complete follow-up of 188 cases out of 196 observed within the six year period covered in the report.

In figuring percentages of results, we consider that more accurate deductions can be made with less confusion and greater simplicity if the patients are classified as "living" after five years, instead of as "absolute cures," or even "symptom-free." We think also that percentages should be based on cases *traced*, and we should not include and consider as dead all those of whom we have lost track. As an example of this we recently had six patients who had not been in the follow-up clinic in from one and a half to four years who returned as a result of an intensive search, all in good health and clinically free from the disease.

PRINCIPLES OF TREATMENT

Ewing states that radium acts on cancer cells by autolytic degeneration, caustic destruction, and growth restraint. The principles on which we have based our method of treatment of cervical carcinoma rest on this theory. It is not advisable to use a dosage sufficiently powerful to destroy the normal cells and thus open up portals of entry for a rapid extension of the malignancy. The beneficial effects that we hope to obtain are the result of the death of the cancer cells only, plus the restraining of the growth of those tumor cells which may have escaped, by the interference with the capillary, venous, arterial, and lymphatic circulation, due to the action of the radium on the proliferating connective tissue. The choking off of the blood and lymph supply as a result of contraction following irradiation means starvation and imprisonment of the remaining cancer cells that have been within the reach of the rays. This is in accord with the views of Ewing and McCarty and of Clark and Keene.

An example of this action of irradiation, whereby malignant cells may be isolated and walled in so as to nullify them, is illustrated in a report of a case in the *Annals of Surgery*, March, 1925, by DeWitt Stettin, who did a radical amputation of the breast for a large-celled alveolar carcinoma, followed by a course of x-ray therapy. A nodule developed one year later which had all the appearances of a typical supraclavicular lymph node metastasis. This nodule of the deep-seated glands which was firmly fixed has remained stationary for five years, and the patient is in excellent health. Dr. Stettin believes that the arrest is due to the isolation of the cells by the scar tissue formation as a result of the x-ray application.

The contraction and cicatrization following the healing after radium therapy is well known. We believe that this accounts for the fact that the results that have been obtained by observers who only have a limited supply of radium at their disposal (100 to 200 mg.), equal those of clinics where very large amounts are available. We doubt whether the application of massive doses can show any better ultimate results than the intelligent application and reapplication of smaller doses.

We start with the principle that every case of cancer of the cervix is a study in itself, and that there can be no uniform or standard dose for the treatment of all cases. Our first dose is regarded as a test dose, usually from 2400 to 3600 mg. hours, and we judge of the effect in that particular case by a careful observation of the conditions existing at the end of six to eight weeks. We think we can tell from the general appearance of the growth whether the several stages of hyperemia, local destruction of tissue, formation of local sloughing, beginning healing process, complete healing, and final cicatrization with marked contraction, which represent the phenomena of irradiation of

the cervix by radium as described by one of us,² are progressing satisfactorily or not. We have tried to learn what the picture should be at the end of each postradiation month. At the end of the third month we expect to find the markedly contracted cervix and vaginal vault of firm consistency with the pallor characteristic of anemic tissues. Later one may observe ecchymotic spots with slight capillary oozing that is not characteristic of carcinomatous erosion; we believe this is due to superficial shedding of epithelial cells, the result of the dwindling blood supply; is analogous to the ecchymosis we frequently see in senile vaginitis, and should not be confounded with a recurrence.

If at the end of the first or second month we find the postradiation stages progressing satisfactorily, we do not reradiate at that time. We observe the patient each month and as long as the conditions remain quiescent and symptomless, continue the watchful waiting. Should there be evident unsatisfactory progress in the postradiation stages during the healing period of three months, or should any sign of rekindling of the malignant process after complete healing manifest itself by an erosion, bleeding, or nodule, we at once reradiate, using a dosage and technic commensurate with the conditions present. In contradistinction to the views of many observers, our experience has been that repeated irradiations in certain of the advanced cases have been of distinct value. In fact some of our five year cases of this class were apparently saved by three or more reradiations. It is to be noted that many of our reradiations consist of the implantation of needles only in suspicious areas. In our experience the monthly inspection is essential to safety. During an interval of three to six months a recurrent malignancy can gain such headway that a serious conflagration may need to be extinguished. If there is an opportunity to plant a needle at the onset of the recurrence, the problem is much simpler, as the chances of smothering the fire during its incipency are greater.

As we consider it important to study the result of the first or test dose, we do not believe it advantageous or logical to give a series of repeated treatments at short intervals as is done in some clinics. We require a sufficient time after the initial dose for the changes to take place in order that the character of the response to the irradiation may be judged. One case may require only the test dose to produce a satisfactory result; another may require several repeated doses at varying intervals, but not closer than six or eight weeks. We see no other way to avoid overirradiation with extensive and undesired necrosis of tissues if we do not thus feel our way in each case.

TECHNIC

The technic of application that we employ has been described by one of us in a preliminary report of our work² and is similar to

that in general use. It is important that a careful vaginal and rectal examination should be made in order that an accurate knowledge of the extent of the disease may be ascertained. A cystoscopic examination is also necessary in advanced cases. Care should be taken, however, to avoid all unnecessary trauma in the bimanual palpation, as there is a distinct danger of a dissemination of the cancer cells beyond the growth. We believe that anchoring of the radium by suture in situ should be done wherever feasible, as it is important to insure the action of the rays in the desired area for the required time. In one of our earlier cases in which the tube was placed in the cervical canal without suture, it was found, when the uterus was subsequently removed, that the tube had evidently slipped up beyond the internal os, as the bulk of the irradiation had been exerted in the body just above the cervix. We employ the brass and rubber screening of the radium tube to filter out the harmful rays, and distance screening with vaginal gauze for the protection of the bladder and rectum. As a rule we prefer the short needle to the long Lee needle, believing it safer and simpler to use with the vaginal packing. As it is necessary for the vaginal gauze to be packed tightly in order to distend the vaginal walls to the utmost to insure proper distance screening, the patient must of necessity be catheterized during the time the treatment is in progress. As this is often difficult on account of the packing, we have found the insertion of a self-retaining catheter during the time of the radium application to be very satisfactory to all concerned.

SIGNIFICANCE OF THE RESULTS

As stated in our recent report, our results for all classes of carcinoma of the cervix treated with radium alone on the above principles show 23.6 per cent living for five years or more. Our results in the Class I and II cases, that is those in which the disease had not extended beyond the cervix, show 52.9 per cent living five years or longer.

The significance of these later figures must be apparent. If we can get patients with carcinoma of the cervix to seek relief *early*, before the disease has made much headway, we may hope to obtain a relative cure in at least 50 per cent without operation. These cases were frankly "operable" cases and have the advantage in comparison with the 25 per cent or 26 per cent claimed for the Wertheim operation, especially when we consider the primary operative mortality. We, of course, appreciate that the definition of "operability" has varied considerably in the Wertheim reports, but when we consider the expert technical training necessary for the proper execution of the radical operation and its primary mortality, we believe that the preponderance of evidence is in favor of radium alone for the treatment of carcinoma of the cervix. The question of operation (simple panhysterec-

tomy) *versus* radium in very early cases of cancer of the cervix, which would be considered as Class I cases, is often debated. Personally, we believe that both methods will cure equally, with the nonoperative mortality in favor of the radium, but at the present time this is a question we rarely have to decide, as so few cases seek relief at this very early stage. We have only three cases recorded as Class I in 196.

We do not operate after successful irradiation for cervical cancer for fear of breaking down the connective tissue barriers and releasing possibly active cancer cells which have been imprisoned by the action of the radium. We are not satisfied at the present time that those who do operate after irradiation can show any better ultimate results than the clinics giving statistics for radium alone.

It seems obvious that the work of educating the laity to seek a diagnosis at the very onset of suspicious symptoms is of paramount importance, in view of the satisfactory results obtained with the radium treatment of cervical cancer in at least 50 per cent of these early cases. The vital importance of the propaganda being carried on by the Society for the Control of Cancer cannot be overstated. There is an urgent need of educating the family physician as well as the laity to the great importance of paying attention to suspicious symptoms in their incipency. Procrastination and failure to make a vaginal examination are far too common.

Apropos of this it is of interest to note the length of time that elapsed between the onset of symptoms and the first seeking of medical advice in our series of cases.

In the 177 cases in which this was definitely stated the average duration of symptoms was about seven months. There were only 10 cases who sought advice at the earliest interval of one month. There were 13 who waited for two years or more. Of the three Class I cases that occurred in the 196, one came after one month, one after three months and one after four months. There were 44 cases in Class II, and the average duration of symptoms in these two classes combined, which represent the disease as limited to the cervix, was about five months. These are the cases in which we may expect to cure 50 per cent, yet precious months were allowed to slip by before relief was sought by the majority. In the 146 advanced cases, Class III and IV, the average duration of symptoms was eight months.

THE RELATION OF TYPE OF CELL TO DEGREE OF MALIGNANCY

It will be helpful in the prognosis of these cases if the attempts that are being made to determine the relation of the type of the cell to the degree of malignancy should prove to be successful and practical. According to a recent statement of Greenough, this would seem to be possible in carcinoma of the breast, but, although efforts have been made by Martzloff and others to determine the relative degree of

malignancy of cervical cancer according to the cell type, their results are open to question, owing to the many complicating factors present. Recent publications from the German clinics are practically uniform in the opinion that histologic prognosis is not practicable. We were interested in having our cases studied from this standpoint, and Dr. Plaut, the Pathologist of the Woman's Hospital, has made an exhaustive study of our slides, independent of our clinical results, and his conclusions are that a satisfactory prognosis cannot be made from the type of cells present. Dr. Plaut's paper will shortly be published.

We realize the difficulties in the problem when we appreciate that the squamous cell type is the slowest growing and the least malignant yet the most resistant to irradiation, while the reverse is true of the most malignant spindle-cell type. We may therefore have to give a more intensive treatment in the less malignant type of case to obtain a satisfactory result. The slower progress of the disease in the squamous or spindle-cell types may give an apparently longer life from the radium therapy, while the more malignant spindle-cell types yield more quickly to the irradiation, yet recur more quickly.

We consider that the constitutional state of the patient is an important factor in the prognosis. We know that there is an absorption of autolytic and nitrogenous waste products as a result of the action of the radium on the tissues, and this may be a serious load to an already handicapped system. The resistance of these usually anemic patients can be materially fortified by a prophylactic blood transfusion, and it is our custom to give 500 c.c. of blood a few days before irradiation in cases needing it, thus enabling them better to combat the toxins absorbed as a result of the treatment.

CARCINOMA OF THE CERVICAL STUMP

The occurrence of carcinoma in the cervical stump left after a supravaginal hysterectomy is of perennial interest, and whether a panhysterectomy should be a routine procedure or not is still a debatable question with some surgeons. In a five year period we had eight such cases and during this time 600 supravaginal hysterectomies were done. During the past seven years we have seen eleven cases and in the same period there were 872 supravaginal hysterectomies. Of these eleven cases, however, only four were previously operated upon in the Woman's Hospital. The incidence therefore is probably less than 1 per cent. These eleven cases have all been treated with radium alone, and in Class I, there was one case; in Class II, three cases; and in Class III, seven cases. The time since the operation for supravaginal hysterectomy until the radium treatment, the duration of symptoms, and the results to date are shown as follows:

CARCINOMA OF CERVICAL STUMP

	TIME SINCE OPERATION	DURATION OF SYMPTOMS	RESULTS
CLASS I	At Woman's Hosp. 1 yr.	1 Month	Living now 3 yrs.
CLASS II	" " " 3 weeks	Ca. Diag. from tissue taken at operation	Living now 6 yrs.
	" " " 2 weeks	Cervix neg. at time of oper., Ca. of cervical polyp, inside canal	Living now 4 yrs.
	" " " 4 years	12 months	Living now 3 yrs.
CLASS III	Oper. Elsewhere 2 yrs., 9 mo.	6 months	Died 1½ years
	" " 10 yrs.	5 months	" 2½ years
	" " 3 yrs.	2 years	" 2½ years
	" " 3 mos.	Not stated, apparently Ca. present at operation	" 4 months
	" " 3 yrs.	8 months	Now living 2 yrs.
	" " 5 yrs.	4 months	Died 1 year
	" " 10 mos.	12 months. Apparently Ca. present at operation	" 6 months

The incidence of carcinoma of the cervical stump after supravaginal hysterectomy is so low, that there is a probability that it would be offset by the slightly higher mortality of panhysterectomy.

CARCINOMA OF THE FUNDUS

It is generally agreed that a panhysterectomy gives such a high percentage of five year cures in carcinoma of the fundus that it is the method of choice. In our experience, however, a large percentage of patients with this condition are such poor operative risks that we have been forced to forego the operation and to use radium only in many of them. In the six year period from 1919 to 1925 we have had 54 cases of fundus carcinoma. We have treated 25 with radium alone, 11 with radium and operation, 14 with operation alone, and two with roentgen rays alone, and two no treatment (one refused and one too far advanced). Thus in 51.9 per cent we did not operate because of the poor operative risk. In classifying these cases as to risk, 41 per cent were considered as good and 59 per cent as poor. Thirty-two were over fifty years of age; 11 were over sixty; two were over seventy.

Obesity, old age, cardiovascular disease, deficient renal function and diabetes were the complications present in over 50 per cent of our cases; consequently we had little choice but irradiation in these patients.

Our end-results in these 52 treated cases of carcinoma of the fundus show that 30 are now living; 20 are dead, and two have not been traced to date. Of the 25 cases treated by radium alone, nine are within the three year period; all have been traced, and four are living three years after treatment, or 44.4 per cent. In the five year period there were three treated; three traced, and none living. In the seven cases treated with radium and panhysterectomy, three are in the three year period; all were traced; three are living, or 100 per cent. There are none in the five year period. (In addition, there were four

cases which cannot be placed in this group, owing to the method of treatment, namely, one case had two radium treatments followed five months later by supravaginal hysterectomy, and died in two years. Another had a panhysterectomy and radium five months later for recurrence and was dead in two years. A third had radium and six months later an exploratory laparotomy, was found inoperable, and died three days postoperative. The fourth case had radium and one year later an exploratory laparotomy; was found inoperable, and died in two years.)

Of the 14 cases treated by operation alone, in the three year period, 9 were treated; 9 traced; 8 are living, or 88.8 per cent. In the five year period 7 were treated; 6 were traced, and 4 are living, or 66.6 per cent. In 2 cases treated by x-ray alone, one is living, for three years, and one died in one year.

Thus it would seem that the operation alone or radium and operation combined gives the best chance for the five year cure.

ROENTGEN RAY THERAPY

We have no data of value to contribute on x-ray therapy. We have not the high voltage machine at our disposal, and our employment of x-ray therapy of moderate voltage, which we carried out on a considerable series of our cases as a postradium treatment, proved far from beneficial in the large proportion of the patients, and apparently positively harmful to some. Certainly we can show no more satisfactory results where we have employed the roentgen rays in conjunction with the radium than with the radium alone. Therefore, we have abandoned it for the present, until such time as evidence can prove to us that the technic and dosage have been placed on an indisputable ground in producing effective results.

SUMMARY

1. For purposes of comparative study a standardized simple classification of the extent of the disease, and the same rules of estimating end-results and percentages, should be adopted by all clinics.

2. A monthly follow-up conducted in person by the surgeon in charge of the patient is of inestimable value as a factor in the successful treatment.

3. The details of technic are important. Especially should over-radiation be avoided, and subsequent treatment should be based upon the reaction to the test dose of radium. This does not permit of employing repeated doses at short intervals, regardless of the response to the *first* dose of radium.

4. In our experience repeated irradiations, three or more, have been of distinct value in certain advanced cases.

5. By watchful waiting it is often possible to extinguish the fire that is rekindling, before it has gained much headway.

6. According to our results radium alone is preferable to surgery in all classes of carcinoma of the cervix.

7. As at least 50 per cent of the early cases of carcinoma of the cervix can be saved by radium, the importance of educating the laity and the family physician to seek an early diagnosis is imperative.

8. While carcinoma of the fundus is best treated by surgery, many times the operative risk is poor and resort must be had to radium and roentgen ray therapy.

9. Large amounts of radium are not necessary to produce satisfactory results.

10. The value of roentgen ray therapy in carcinoma of uterus is still an undetermined question.

11. Every case of carcinoma of the uterus should be individualized and treated accordingly.

12. The ideal therapy for carcinoma would be one that would reach the malignant cells wherever located. Should Blair Bell's theory be right that carcinoma is a "specific growth process," the result of an atavistic throwback of the normal cell to its early embryonic type, which has potential malignant characteristics as a result of a failure of its restraining hormone, and if that hormone or some substance that is lethal only to the malignant cell can be found for intravenous therapy, we will welcome it as one of the greatest blessings of mankind. But until that time we must continue to rely on surgery and irradiation as the only means at our disposal that have been of value in combating this terrible disease.

REFERENCES

¹Ward and Farrar: Radium Treatment of Carcinoma of the Cervix Uteri. Results at the Woman's Hospital after Five Years, Jour. of Am. Med. Assn., July 18, 1925, lxxxv, 159-162.

²Farrar: Preliminary Report of Primary Carcinoma of the Cervix Uteri Treated with Radium in the Woman's Hospital in the State of New York, AM. JOUR. OBST. AND GYNEC., August, 1925, x, No. 2.

48 EAST FIFTY-SECOND STREET.

611 WEST ONE HUNDRED TENTH STREET.

PRECANCEROUS LESIONS OF THE UTERUS*

BY PALMER FINDLEY, M.D., F.A.C.S., OMAHA, NEB.

APPROXIMATELY 13,000 women died of cancer of the uterus in the United States in 1924. Appalled by this frightful mortality we ask: "What can be done to lower the death rate?"

It must be apparent to all who are conversant with the cancer problem that we find little encouragement in scanning the records of surgeons and radiologists. True, there has been progress made in both of these fields, whether employed singly or conjointly, but such progress has been feeble and inglorious. We are not satisfied with the results, and we do not anticipate any considerable advance in the results of treatment through surgery, the x-ray or radium so long as cases present themselves in the advanced stages of the disease. We say that cancer is curable if taken in time, but how seldom do we see these cases while it is yet time to effect a cure! In my entire experience I have not seen more than three such cases. Frank has found but two cancers of the cervix which could not have been recognized without the aid of the microscope and no less an authority than Schottländer reports no more than 2 per cent of accidental finds in his laboratory work.

Inasmuch as there are no symptoms in the earliest stages of cancer of the cervix, little progress will be made in our efforts to educate the public if we limit our instructions to the admonition to consult a competent physician when suspicious symptoms arise. If we wait for symptoms we have usually waited too long. We must do more; we must admonish women who are passing through the cancer age to seek periodic examinations; not alone for the purpose of detecting cancer in the early stage of its development but, what is more profitable, to recognize the existence of precancerous lesions. "Prevention is better than cure" is an old adage that strikes us with added force in the consideration of the cancer problem.

No one is so bold as to assume an air of complacency in his management of cancer of the cervix. Most of us have acquired the attitude of Meigs, who said to his students in 1848, "It is enough to make a physician's heart sink within him to make the diagnostic of cancer uteri; for such a diagnostic is *ipso facto* a prognostic of death; and when the physician has made it, and is brought to the point of giving true expression to his opinion, he might be supposed to be as painfully situated as an English judge when he puts on his black cap before the final pronouncement unto death." Meigs was speaking before the days

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, and 18, 1925.

of hysterectomies, x-rays and radium, yet he knew that cancer did not arise from healthy tissues; said he: "There is always an antecedent state of alteration of tissue; a state which lays the foundation for the mild evolution and increase in cells." He believed that the time to cure cancer was before it had become a cancer.

To my mind, the only means at our command to lower the death rate of cancer of the cervix materially is to attack precancerous lesions in the cervix. I believe that the major portion of cancers of the cervix are preventable. These precancerous lesions are well known; they are easily recognized, and by intelligent and diligent management they can be eliminated.

I do not believe that uncomplicated lacerations of the cervix constitute a precancerous lesion. Schottländer says he has never seen a cancer develop from the site of a laceration in the absence of erosions and ectropion. While lacerations are frequently associated with cancer of the cervix, observations on the early cancers demonstrate that cancer begins anywhere on the surface of the cervix except in the laceration. Bonney, on the other hand, has never failed to find evidence of a preexisting erosion in all early cancers of the cervix. Exposure of the delicate columnar epithelium, which forms the surface of an unhealed erosion and of an ectropion, to the irritating acid secretions of the vagina, to the insults of the vaginal walls, and to the constant attacks of microorganisms which abound in the vagina, predisposes to the development of cancer. Erosions and eversion of the cervix constitute potential cancers, and, viewing them as such, our efforts should be directed toward the repair of lacerations and the treatment of endocervicitis, because these are the forerunners of eversion and erosions of the cervix, just as the latter are the forebears of cancer.

There seems to be no consensus of opinion as to what constitutes precancerous lesions of the cervix. Various interpretations have been placed upon the structural changes which antedate the development of cancer in the cervix. Epithelial cells that are enlarged, irregular in size and outline with hyperchromatic nuclei and indistinct border outlines characterize malignancy in the opinion of Schottländer, while Pick looks upon such changes as indicative of regeneration. Ewing goes one step further and says that we are dealing with early carcinoma when to the above features there is added the downward growth of epithelial papillae and definite heterotopia. Rubin is quoted by Ewing as finding many phases of precancerous lesions in old erosions of the cervix where there is proliferation of atypical cylindric and squamous cells, both superficially and in the glands. It is generally conceded that epidermization of the cervical canal does not inevitably constitute a precancerous lesion, but it is from such alterations of the cell structure that cancer usually arises. I think all will agree with Ewing that, "when atypical hypertrophic and hyperchromatic cells are growing

downward from the epidermis or fill enlarged gland alveoli, the diagnosis of beginning carcinoma is justified." It is small wonder that experienced pathologists differ in their interpretations when there is so great an intermingling of squamous and cylindric epithelium on the surface and in the glands.

Thomas Wilson of Birmingham, in speculating on the inception of cancer, says it may be that the precancerous condition is already malignant or that the precancerous condition "prepares the ground, so to speak, in which the cancer seeds are enabled to germinate; or, further, it is conceivable that the condition represents the first attempts of the body to protect itself against cancer that is already implanted, or is in process of evolution."

Frank takes issue with Ewing, Schottländer, Shanenstein and Rubin, whom he styles as radical pathologists, who "classify as beginning cancer conditions which, lacking as we do absolute histologic criteria of early malignancy, may as well prove to be harmless epithelial proliferation." Frank protests against the tendency to remove uteri on suspicion only. In his admirable monograph (*Gynecological and Obstetrical Pathology*, Appleton) Frank says that this tendency "has led to a craze for hysterectomy compared to the Batty craze for oophorectomy of the late seventies," and questions "whether the mortality of complete hysterectomy does not far exceed the problematic prophylactic gain." The confidence of Frank in his diagnostic acumen is revealed in the expression: "A carcinoma is unmistakable and, in accord with Liebharch, the writer must insist that, while a specimen may be suspicious, in a given case we are dealing either with a cancer or not." Where doubt cannot be expelled, Frank would counsel watchful expectancy by a competent observer for a few weeks when a new exploratory incision can be made or more definite, though still early, signs develop.

I cannot subscribe, either in theory or in practice, to the conclusions of Frank. We occasionally encounter borderline cases which baffle both the clinician and the pathologist. In such cases I believe delay to be hazardous and that it is the part of wisdom to regard all such cases as malignant.

Precancerous lesions of the corpus uteri are commonly designated as fibroid tumors, polyps and hyperplasia of the endometrium. When we recall that fibroids and cancer of the body of the uterus are associated with far greater frequency than are fibroids and cancer of the cervix, it is fair to assume that there is a causal relationship. If such there be, then we may further assume that the endometrial changes accompanying fibroids of the body of the uterus constitute a precancerous lesion.

While benign polyps may become malignant, I am of the opinion that many errors in diagnosis made by the pathologist are due to multiplication and stratification of the epithelium.

So-called hyperplastic endometritis is unquestionably a precancerous lesion and the line of demarcation between the benign and the malignant cannot always be discerned by the most competent pathologist. Great increase in number and irregularity of the gland structures may present a most perplexing problem. We must, however, recognize the fact that increase in the cell-layers lining the surface and glands of the endometrium is not evidence *per se* of malignancy; nor is epidermization a necessary approach to malignancy.

Benign epidermization of the endometrium is not an uncommon finding as the result of curettage followed by the application of escharotics and as an accompaniment of pyometra. We occasionally see such apparently benign changes in the endometrium associated with cancer of body and cervix. While recognizing the occurrence of epidermization as a benign lesion, I would regard extensive changes of this sort as the precursor of cancer. In all cases where great irregularity in cell form and size, atypical mitosis, and hyperchromatism are found, the diagnosis of malignancy is established.

428 AQUILA COURT.

(For discussion see page 519.)

CERVICITIS, EROSION AND LACERATION OF THE CERVIX UTERI FROM THE STANDPOINT OF PATHOLOGY

By G. L. MOENCH, M.D., NEW YORK, N. Y.

(Asst. Prof. of Gynecology and Instructor of Gynecologic Pathology, N. Y. Post-Graduate Medical School and Hospital)

THERE is scarcely a field in medicine where such a woeful lack of unanimity exists as in the treatment of cervical infections. In part this is undoubtedly due to a failure in giving due consideration to the protean aspects of the underlying pathology. A further abetting factor is the rather confusing terminology employed; erosion, pseudo-erosion, ectropion, etc., are used indifferently and without due regard as to what these terms actually mean.

In order to gain an adequate idea of the pathology of the cervix, we must first examine the normal cervix, not only in its later stages but also in its embryologic development. The müllerian ducts form the tubes, uterus, cervix and vagina. At first, the müllerian tubes are lined throughout by the same type of columnar epithelium, but changes soon take place and form the four different mucus membranes found at birth in the different portions of the female genital tract. Postnatally the fallopian tubes are lined by ciliated columnar epithelium. The uterus likewise shows columnar epithelium with, however, only a few patches of cilia and here and there some scattered secreting cells. At a still later date the characteristic tubular glands and their cytogenic stroma also develop here. In the cervical canal the epithelium is a mucus se-

creting epithelium with many racemose glands which penetrate rather deeply into the musculofibrous tissue of the cervix. In some textbooks the lining epithelium of the cervix is described as ciliated, but this is not correct. The cervical glandular epithelium is a direct continuation of the epithelium of the cervical canal, and, as the cervical glands secrete mucus, we see that cilia are not to be expected here, as a ciliated epithelium is not a mucus secreting epithelium. The cervical and uterine mucous membrane has a very definite line of demarkation at the isthmus uteri. This line of demarkation usually corresponds to the anatomic internal os. In some cases a slight invasion of the two types of mucous membrane into each other is seen at their junction, but this zone is never more than one millimeter broad, even in the adult. The mucous membrane of the cervix, however, differs not only in structure from the uterine mucous membrane but also in that it does not pass through the cyclic (menstrual) changes which involve the endometrium during the sexual life of woman. Even the mucous membrane of the isthmus uteri, similar though it be to the mucosa of the uterus, usually participates only slightly in the menstrual phases.¹ In addition to the difference of their respective mucous membranes the body of the cervix also differs from the uterine wall in being firmer and containing more fibrous connective tissue. Occasionally small lymph follicles are seen in it, as shown by a number of slides in my possession.

It is in the vagina that we see the greatest change in the original epithelial lining of the müllerian ducts. Here squamous cell epithelium, growing from below upwards, replaces the original columnar epithelium. Normally this squamous cell growth not only comes to line the whole vagina but also at first penetrates into the cervical canal. It is found there in the sixth month of fetal life and often even later (see Fig. 1), but is nearly always again pushed out and replaced by the columnar epithelium which represents the normal lining of the cervical canal in later life. Nevertheless, remnants of squamous epithelium may persist here. Consequently, the presence of squamous cell epithelium in the adult cervix does not necessarily mean a metaplasia, and, therefore, is not in itself to be regarded as evidence of a previous inflammatory process.

In about one-third of all cases² the columnar epithelium of the cervical canal, instead of pushing out the squamous cell epithelium only as far as the external cervical os, grows beyond it to a varying degree on to the outer surface of the portio. We have, as a result, an external os surrounded by an area of columnar epithelium. Macroscopically such an area will appear as a reddened zone and has been called a *congenital erosion*, better *pseudocerosion* (R. Meyer). Such a condition, though called erosion, is of course nothing but a congenital anomaly of growth, but, to add further to the already existing confusion, congenital "erosions" are also called "*histologic ectropions*." This is likewise incor-

rect, as ectropion means eversion. The terms erosion and ectropion are, however, even more indefinite than they seem now, because they have also been applied to other histologically and etiologically different lesions of the cervix, as will be shown.

One would think that congenital pseudoerosion might cause trouble later on in life, but this is not the case, as these congenital anomalies usually heal, that is, become recovered by squamous epithelium. It is interesting to note in this connection that Courrier³ and others have



Fig. 1.—Longitudinal section of the cervical canal of a ten-year-old girl. At the lower part of the picture is seen the anterior cervical lip projecting into the vagina; EO indicates the external os, and XX the limits of the squamous cell epithelium in the cervical canal. The projecting wedge seen at the upper part of the photograph is due to the section passing through a projecting ridge of the left lateral wall of the cervix. It is not a polyp.

found that the injection of ovarian extract causes proliferation of the squamous cell epithelium of the vagina in the newborn. Courrier's experiments corroborate R. Meyer's findings of a "Verschleimung" of the vaginal wall in rodents and dogs during pregnancy when the ovarian function is diminished. It is possible, therefore, that the beginning ovarian function at puberty is a factor in the healing of congenital pseudoerosion and supplies the stimulus needed to cause the squamous epithelium to regain its normal location.

Based on the findings in the congenital pseudoerosion, some pathologists have denied all cervical erosions to be anything but congenital misplacements. This opinion, however, is not correct, as we shall see directly.

Among the actual inflammatory lesions of the cervix we must first consider certain specific diseases. Syphilis, though rare, occurs at times either as chancre, mucous patch, or gumma, which do not differ from the same lesions anywhere else. Tuberculosis may affect the cervix as ulcers, miliary tubercles or, rarely, as small papillae on the surface of the portio.⁴ The last condition I have seen only once.

Generally an inflammation of the cervix is due to infection with the gonococcus or with the staphylococcus, streptococcus, coli bacillus, pneumococcus or similar bacteria although even parasites such as oxyuris or trichomonas may cause irritation. The infection arises locally as spontaneous, auto- or heteroinfection, or, at times, apparently is carried by the blood stream.

Some clinicians claim that gonorrheal infections produce a characteristic clinical picture. A thick mucopurulent discharge, for instance, is considered one of the indexes of gonorrhea. Such a discharge seems indeed to be frequent in gonorrheal infections but certainly is not pathognomonic. Others hold that infections of the nulliparous cervix are always gonorrheal. This statement is certainly too broad, because cervicitis, salpingitis and even peritonitis may at times occur spontaneously, for example, during the menstrual period, even in a *virgo intacta*. A specific form of cervical gonorrhea does indeed exist although it is seen very seldom. This latter disease is characterized by the formation of pointed condylomata on the cervix similar to those found so frequently on the skin in cases of gonorrheal infection.

In infections of the cervix we are dealing either with acute or chronic inflammation, and, histologically, the same morphologic differences are present as anywhere else in the body. Clinically, acute cervicitis is not as important as the chronic form, because it either heals rapidly or, more usually, becomes chronic. In both the acute and chronic forms of cervical infections we have a more or less purulent discharge, as the characteristic clinical expression of the disease. It is, perhaps, important here to call attention to the necessity of separating actual inflammations of the cervix from such cervical processes as, for instance, pregnancy and chronic hyperemia from any source, where the cervical secretion is increased but not changed in character. Secondary infection, of course, may also occur in cases of pure hyperemia and long continued congestion may, in any case, result in cervical hypertrophy and fibrosis. The original processes in simple hyperemia and infection are, however, definitely and distinctly different. Despite statements to the contrary, cervical polyps found in so many patients must not be considered *eo ipso* as evidence of a previous inflammation, any

more than the before-mentioned squamous epithelial patches in the cervical canal. In both affections, though, secondary inflammatory processes may be present.

Histologically, infections of the cervix may show desquamation of the epithelium of the cervical canal but usually only in severe cases. As a rule the desquamation affects the glands only very slightly, if at all. It is not the epithelium, however, but the stroma of the cervix that shows the greatest changes. All the histologic signs of inflammation are present here. In acute cases many leucocytes are seen; in less severe or more chronic cases lymphocytes, either scattered diffusely or in patches, and often many plasma cells are in evidence. The idea that plasma cells are in any way characteristic for gonorrheal infections is no longer tenable. In a large number of cases of chronic infection, both of the tubes and of the cervix, I stained for plasma cells and found them present in large numbers, irrespective of whether the process was due to the gonococcus or the streptococcus or staphylococcus.

Since the inflammatory reaction in the cervix, in contradistinction to the uterus, is never limited to the mucous membrane or endocervix, but extends out even as far as the squamous cell epithelium, covering the portio, the term "endocervicitis" should be given up, and the term "cervicitis" used as it corresponds more nearly to the actual pathology.

In addition to the processes described, other changes also occur in the cervix. One of these is the formation of cysts by obstruction of the gland ducts, and we have here one process by which the nabothian cysts are formed. Another change in the inflamed cervix may be the production of an ectropion, especially in acute conditions. Such an eversion or protrusion of the mucous membrane of the cervical canal (inflammatory ectropion) is due only to the inflammatory hyperemia and resembles the same process seen in other locations, especially in the urethra.

Such an ectropion must not be confused with what is ordinarily called cervical erosion. This latter process has been especially often misunderstood. In severe inflammatory conditions, the squamous cell epithelium covering the portio may be desquamated just as the cervical canal epithelium in similar lesions. When such a process occurs around the cervical os we have clinically, a reddened area around the os and, histologically, a true erosion, specifically called *erosio granulans*. The surface of such an erosion has no epithelial covering but shows purulent, or fibrinous deposits or granulation tissue. Usually such histology is not of long duration, as the denuded surface becomes covered by columnar epithelium, which is more resistant to maceration than squamous cell epithelium. When this occurs we are again, as in the congenital lesion, dealing really only with a pseudoerosion or with what Fränkl, I believe, rightly considers as the first stage of healing of the

inflammatory erosion.⁵ We see then that the pathologists who claim that all cervical erosions are congenital displacements are in error. At the same time it seems that the epithelial changes which occur embryologically in this region leave a rather unstable balance between the columnar and squamous cell epithelium. It may very easily be that the frequency of inflammatory cervical erosion is influenced very markedly by such an epithelial imbalance.

There has been much discussion regarding the derivation of the columnar epithelium in inflammatory erosions. The idea that the epithelium is derived from the basal cell layer of the squamous cell epithelium, believed by some pathologists (Ruge,⁶ Veit⁷), must be discarded. The epithelium is derived either by direct extension from the cervical canal epithelium or from some of the superficially lying cervical glands which easily can and do reach the surface of the portio.⁸ Probably both sources are to be considered, even in the same case.

The columnar epithelium of a cervical erosion may be a single smooth layer or may connect directly with the superficial cervical glands. Depressions, indentations and actual ingrowths of the erosional surface epithelium may also develop (*erosio glandularis*). This is not strange, inasmuch as the cervical epithelium may be expected to retain its characteristic ability to form glands, even though located on the surface of the portio instead of in the cervical canal itself. We also know that inflammation of the tissues in itself may produce a penetration of glandular structures into the underlying tissues. This is seen, for example, in the gall bladder and intestine, to cite only two well-known instances. Sometimes an erosion is accompanied by the formation of cysts (*erosio cystica*) or many deep indentations are produced causing a papillary appearance (*erosio papillaris*). Even exophytic instead of endophytic growth is seen (*erosio polyposa*). The latter two, especially the last one, are, however, unusual. (R. Meyer,⁹ Kerwin,¹⁰ Geller.¹¹)

We see, therefore, that all the various forms which an inflammatory cervical erosion may assume are essentially only parts of one and the same process. We have also seen that nature's first attempt to heal the lesion is by covering it with columnar epithelium since the latter is more resistant to maceration. As the inflammatory process subsides, further attempts at healing of the erosion take place. The columnar epithelium in the course of events again becomes replaced by squamous cell epithelium (second stage of healing of Fränkl). This is achieved by a pushing of the basal cell layer of the squamous epithelium under the columnar epithelium, thus lifting off the latter. The squamous epithelium in the process grows across the mouths of such glands as may be present on the portio surface, and may, at times, even penetrate into the necks of these glands, but, as the glands themselves remain, another mode of formation of the ovula nabothi is given (Fig. 2).

Since the secretion of the undestroyed glands may either rupture through the newly-formed squamous cell epithelial covering or lift it off, and, since relapses of the inflammatory process may cause re-desquamation of the squamous epithelium, the second stage of healing of an inflammatory cervical erosion is to be regarded only as a transitory stage. It results either in reformation of the erosion or leads on to the third stage or stage of definite healing, in which the squamous cell epithelium manages to replace the columnar surface epithelium at all points and also to fill out the glands. In this way squamous epi-

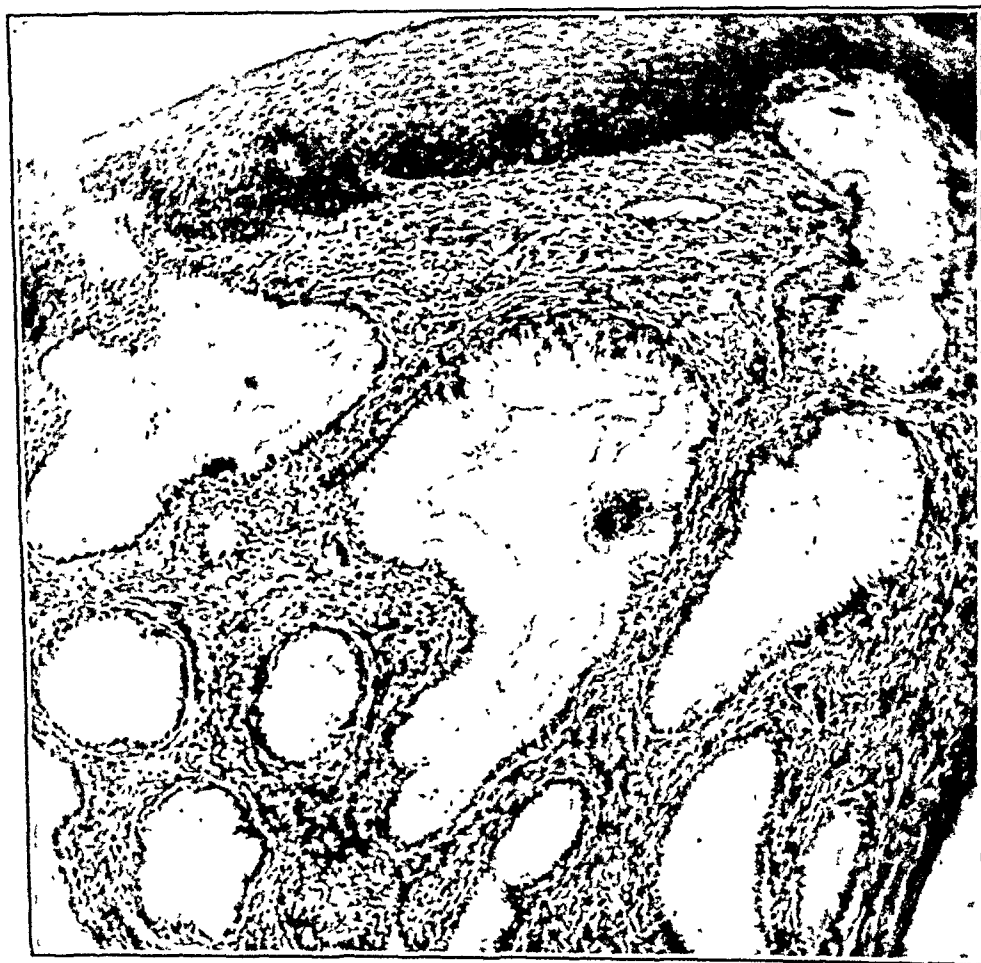


Fig. 2.—The photograph shows a markedly inflamed cervix with dilated partly cystic glands. The squamous epithelium at the top of the picture has grown across the mouth of two glands (second stage of healing) but at the upper left of the picture we see the gland again breaking through the squamous epithelial covering. The erosion temporarily healed is showing signs of recurrence.

thelial downgrowths occur which, to the inexperienced, may give the impression of malignancy.¹² At the same time careful investigation will reveal the basal membrane to be everywhere intact.

The growth of the squamous cell epithelium in a healing erosion is derived from the edges of the erosion and also from microscopic islands of squamous cells usually left in an erosion.

In the lacerated cervix we have all the possibilities hitherto men-

tioned, but, in addition, some other pathology, dependent only upon the laceration. One of these is the eversion of the cervical lips (*laceration ectropion*). In such instances the cervical os becomes surrounded by a reddened zone, which is apparently an erosion but which in reality represents only the everted, normally present mucous membrane of the cervical canal. The condition is the result of the pulling apart of the cervical lips by scar tissue shrinking. Such scar tissue shrinkage may also bury islands of columnar or squamous cell epithelium, which may become cystic, giving us still another mode of formation of the ovula nabothi.

It is important also in this connection to state that not infrequently in lacerations and eversions of the cervix the squamous epithelium grows further upwards into the canal than it does normally in an un-lacerated cervix. Here, apparently, we again have an effort of nature to replace abnormally exposed mucous membrane.

CONCLUSIONS

1. There is present, as an ontogenetic factor, a certain imbalance between columnar and squamous epithelium at the external os of the cervix uteri.

2. The so-called congenital erosion, due to an anomaly of growth, should be called congenital pseudoerosion.

3. Inflammation of the cervix may be acute or chronic. The acute form is of less importance than the chronic as it either heals quickly or becomes chronic.

4. The histologic changes in all cases of cervicitis, with the exception of certain specific cases, such as syphilis, tuberculosis and one or two other rare forms, are all the same. Gonorrhea, with one exception, does not exhibit any definitely characteristic features.

5. The term "endocervicitis" should be replaced by the term "cervicitis" as corresponding more nearly to the morphology present.

6. The inflammatory erosion of the cervix has a stage of actual true erosion and three stages of healing in which it is covered, first, by no epithelium at all; then by columnar epithelium; and in the last two stages by squamous cell epithelium.

7. An ectropion may be due to marked, especially acute, inflammation (*inflammatory ectropion*), or may be due to laceration and eversion of the cervical lips (*laceration ectropion*).

8. The type of epithelium found in a so-called erosion is no criterion as to whether the process is an erosion or an ectropion and even the microscope may find it hard to decide the question.

9. Nabothian cysts may be due to inflamed obstructed gland ducts or gland ducts closed by pressure from an inflammatory reaction as in erosions in the first stage of healing. They may also arise from glands

whose ducts are covered by squamous cell epithelium in the second stage of healing of an erosion, or again may be due to traumatically displaced and buried islands of columnar or squamous cell epithelium. This last origin is usually the result of lacerations of the cervix.

REFERENCES

- ¹Nuernberger: The Biology of the Isthmus Uteri, *Ztschr. f. Geburtsh. u. Gynäk.*, 1922, lxxxv, 1.
- ²Meyer, R.: *Arch. f. Gynäk.*, xxxi, 90 and 91, *Gynäk. Rundschau*, 1911, p. 330.
- ³Courrier: *Rev. franç. d'endocrinol.*, Paris, April, 1925.
- ⁴Vogel, W.: *Portio Tuberculosis*, *Klin. Wehnschr.*, vol. 2, No. 5.
- ⁵Fränkl: *Liepmann, Handb. d. gesamt. Frauenkunde*, ii, 1914.
- ⁶Ruge: *Ztschr. f. Gynäk.*, ii, v, viii; *Zentralbl. f. Gynäk.*, 1881.
- ⁷Veit: *Ztschr. f. Gynäk.*, xiii; *Ergebn. Geburtsh. u. Gynäk.*, 1910; *Deutsch. med. Wehnschr.*, 1911.
- ⁸Schottlaender: *Monatschr. f. Geb.*, xxvi.
- ⁹Meyer: *Arch. f. Gynäk.*, cxv.
- ¹⁰Kerwin: *AM. JOUR. OBST. AND GYNEC.*, vi, No. 2.
- ¹¹Geller: *Zentra'bl. f. Gynäk.*, 1923.
- ¹²Meyer, R.: *Zentralbl. f. Geburtsh. u. Gynäk.*, 1922, xev, 440.

30 EAST 58TH STREET.

ENDOMETRIAL ADENOMA (IMPLANTATION) IN THE VERMIFORM APPENDIX*

BY M. G. SEELIG, M.D., ST. LOUIS, MO.

(*Professor of Clinical Surgery, Washington University School of Medicine*)

THE chapter on newgrowths of the appendix is peculiarly complicated. One group, the so-called pseudomucinous tumors, almost defies judgment. Sometimes this variety of tumor runs an appallingly malignant course; in other instances, it responds as kindly to treatment as does the simplest chronic inflammation. Even after studying innumerable serial sections, I have been unable to determine whether I was dealing with a malignant or a benign process. A careful study of the literature does not resolve the uncertainty and doubt. If the patient recovers, we are content to call the disease "pseudomyxoma peritonei"; if death occurs after a period of marked physical decline and cachexia, we are almost forced to entertain the thought that the disease was "disseminated colloid carcinoma," without typically demonstrable cell pictures.

A second group of the perplexing tumors of the appendix are the so-called carcinomata. Here we may be able to predict the course of the disease with a fair degree of certainty, or we may, again, be confronted with great difficulty in correlating microscopic findings with the future course. The frank adenocarcinoma or the colloid type of adenocarcinoma with well-marked proliferation of alveoli, is a definitely malign-

*From the Surgical Service of the Jewish Hospital of St. Louis.
Received for publication, December 30, 1925.

nant disease, comparable to adenocarcinoma elsewhere in the intestinal tract. The medullary type, however, furnishes an entirely different problem. These tumors practically never recur, metastasize or kill. It is doubtful whether we can continue much longer to call this type of growth carcinoma. In my own limited experience I have never seen recurrence, metastasis or death follow the removal of this type of tumor, and I have been inclined strongly to regard these tumors as endothelioma of a rather inactive type clinically. Ewing¹ says: "In some cases (of carcinoma of the appendix) the epithelial cells possess little growth capacity and become more intimately incorporated with the increasing stroma, so that the structure resembles that of endothelioma arising from

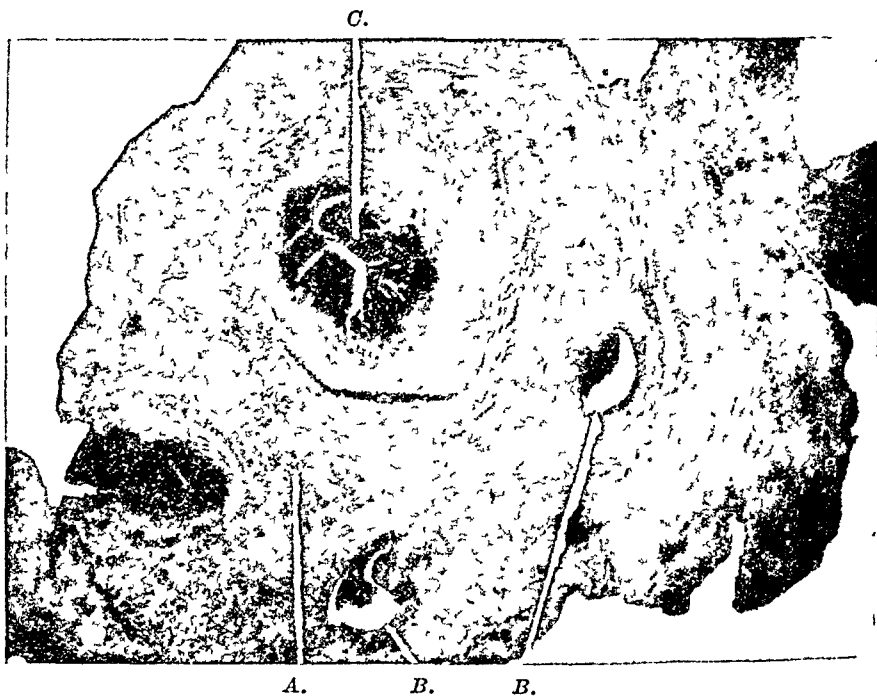


FIG. 1.—Low power picture of section transversely through appendix showing lumen, wall of appendix, and endometrial tissue. Note the marked hypertrophy of muscle coats (myoplastic reaction). A, Wall of appendix; B, endometrial tissue; C, lumen of appendix.

the lymph spaces of inflammatory connective tissue. These cases have apparently been interpreted as endothelioma by Glazebrook, Kelley and others. Sudsuki and Millner regard the structure as indicating an inflammatory origin, and hold that the great majority of carcinomata of the appendix are spurious." McWilliams² comments on the remarkable fact "that primary cancer of the appendix which microscopically appears to be a malignant growth is a relatively benign tumor when viewed clinically, since it does not tend to involve the lymphatics nor to form metastases. Recurrences after operation are almost unknown." Of course, the above quotations must not be construed to mean that carcinoma of the appendix may not run a very rapid course, spreading, involving the cecum and regional lymph nodes and destroying life.

McWilliams quotes a series of seventy-nine cases of carcinoma of the appendix reported by Rolleston in which there was a 1.2 per cent of recurrence after operation. The point is this: The surgeon, in attempting to set a prognosis in tumors of the appendix has, for years, been confronted with the perplexing problem of interpreting the colloid tumors and the carcinomata that attack this organ.

More recently, the confusion has been increased by the description of a new type of cellular invasion of the appendix, endometrial implants. Here, however, the problem is not due to difficulty in predicting the course of the disease, but rather to the fact that we have not familiarized ourselves with the pathologic gross and microscopic pictures of these endometrial implants, and that we therefore do not recognize the disease confronting us. These endometrial implants are, in all probability,

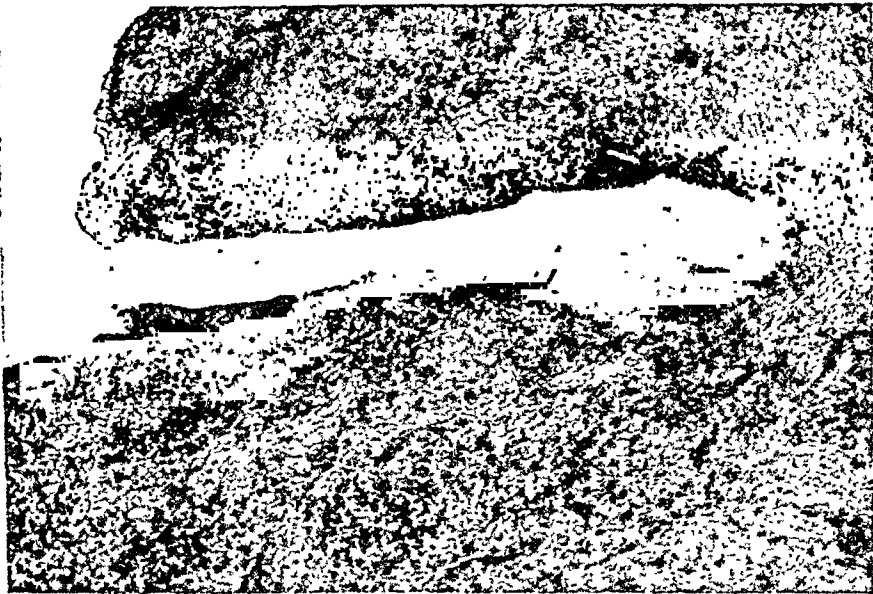


Fig. 2.—Uterine gland penetrating into wall of appendix from surface.

going to prove to be much more frequent in occurrence than present figures seem to warrant. In several respects they resemble carcinoma clinically and microscopically, and yet both clinically and microscopically, they are clear cut in their benignancy. The study of these tumors has, up to now, commanded the attention only of the pathologists and gynecologists. It is imperative that surgeons should also become familiar with this chapter of the pathology of disease of the appendix; and it is on the basis of this need that the following case history and comments are published.

Mrs. W., a thirty-seven year old nulliparous woman, was sent to the hospital four days after an abdominal crisis following the eating of raw pineapple. A few hours after the ingestion of the pineapple, severe cramps set in accompanied by moderate vomiting and a mild diarrhea lasting two days. She thinks she had a pronounced elevation of fever during the first day of the attack, but no chill. The cramps continued up to the time of admission to the hospital.

The family and the past history did not contain any facts bearing significantly on her present illness, except that she has had drenching night sweats, suggesting the possibility of tuberculosis (ileocecal). In June, 1922, two years before the present illness, she complained of general body pains and malaise and was examined with negative results. Ten years ago she had a similar attack, also following the eating of pineapple. The menstrual history was negative, and there is no statement in her case record establishing any relationship between her abdominal pain and menstruation. Urine, stool, stomach content and blood Wassermann examinations were negative. The blood count showed, 4,480,000 red and 4,800 white cells, hemoglobin 90 per cent. Abdominal examination revealed an area of exquisite tenderness, the size of half a dollar, located on the right side, two finger-breadths' above Poupart's ligament and two inches internal to the anterior superior spine of the ilium. There was no muscle spasm, no rebound pain and no evidence of general peritoneal involvement. Vaginal examination disclosed in the right vaginal fornix an egg-shaped mass, ten-

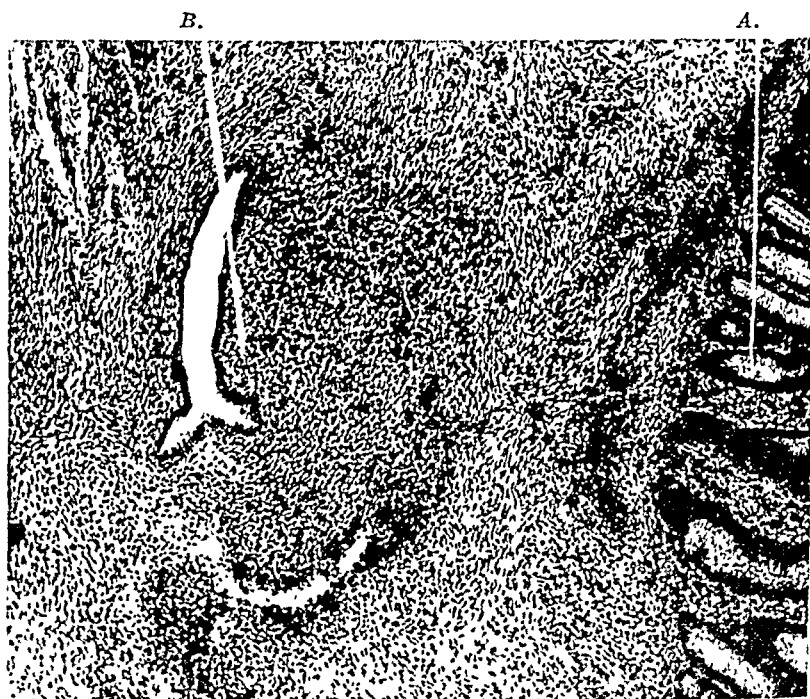


Fig. 3.—Endometrial tissue (gland and stroma) near lumen of appendix. A, Mucosa of appendix; B, endometrial tissue (gland and stroma).

der, elastic, and closely connected with the uterus, which was in anteversion, of normal size, movable and not tender. The mass extended well up to the point of abdominal wall tenderness. The case history records my impression as follows: "This mass is too low to be assuredly of appendicular origin and extends up too high to be assuredly adnexal in origin. The symptoms point to intestinal disease. Ileocecal tuberculosis must be borne in mind. Observation is advised." X-ray studies of the intestinal tract were negative. A note on the history next day records: "In view of the fact that the patient complains of general abdominal pain after taking food, I am beginning to feel that the pelvic condition (if it is tubo-ovarian) is incidental to a major lesion in the cecum or appendix."

Eleven days after admission to the hospital, there was so much distress following eating that it was decided to perform an exploratory operation. During these eleven days, there had been no fever, and repeated examinations had failed to furnish any conclusive evidence leading to a definite diagnosis.

Exploration disclosed a mass the size of a hen's egg attached to the flare of the ileum. The fimbriated end of the right fallopian tube was fused in the mass. Right ovary, left appendages and uterus normal. The cecum was involved in the mass, but the appendix was not demonstrable. By blunt finger dissection the mass was mobilized, releasing the cecum from the ileum. The posterior surface of the cecum was ragged and friable, bled easily and freely, and was covered with a layer of grayish green fibrin. A mass about the size of a pecan was felt in the posterior wall of the cecum. By blunt dissection this mass was freed and proved to be an inch long appendix, coiled on itself like a snail shell. The bed occupied by the posterior wall of cecum and appendix was made up of a vascular granulation-like tissue that strongly suggested carcinoma. The appendix was removed and the wound closed around a small rubber dam drain. Gross examination of the appendix showed that it was completely stenosed at its middle point. The distal segment contained imprisoned feces. There was no demonstrable perforation.

Dr. George Ives, pathologist to the Jewish Hospital, was at a loss to explain the

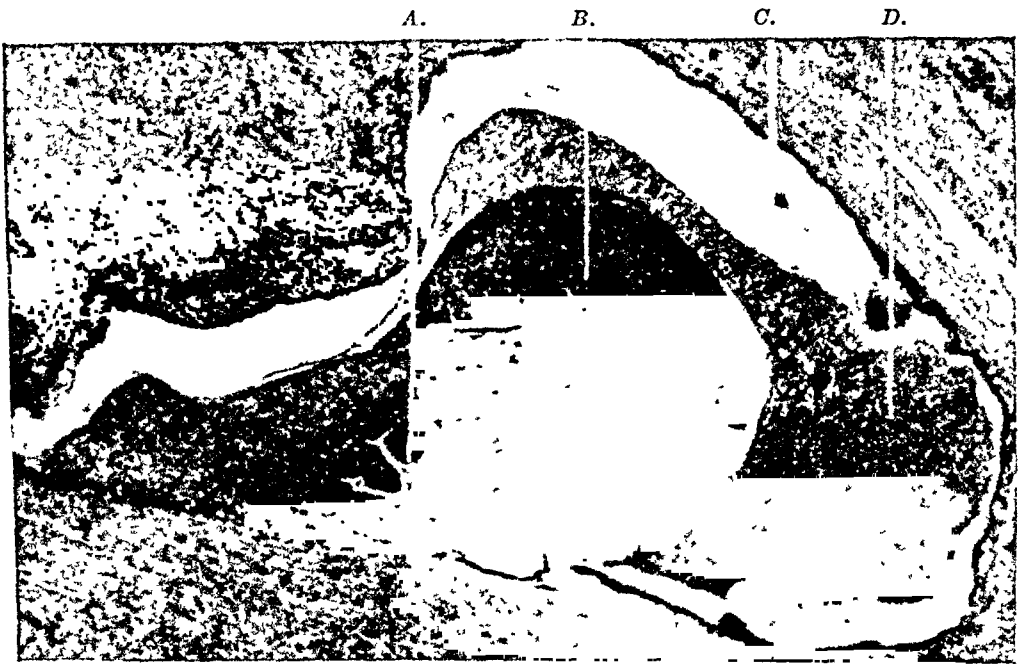


FIG. 4.—Cavity within wall of appendix partially filled with blood clot and with endometrial tissue. *A*, uterine gland; *B*, stroma; *C*, cavity in wall of appendix; *D*, blood clot.

presence of acini in the wall of the appendix and made a tentative diagnosis of adenocarcinoma. After more thought, he reached the conclusion that he was dealing with a case of endometrial implantation. Dr. Otto Schwarz, to whom I am indebted for many courtesies in connection with this report, concurred in the opinion of Dr. Ives. I am certain that, had I been alert or properly qualified, I would have realized or at least have suspected the true state of affairs at the time of operation.

Here, then, was a case that defied accurate preoperative diagnosis, eluded diagnosis at time of operation, and so nearly misled us that we were perilously close to informing a distressed husband that his wife had a cancer. A mere familiarity, on my part, with the fact that intestinal endometrial implantation is a fairly common process might have protected me against all of these pitfalls.

There is no occasion to furnish a detailed description of the microscopic sections; but, as a matter of record, five sections are reproduced.

Sampson³ has described the lesion in his paper on "Intestinal Adenoma of the Endometrial Type," and he must be credited with the honor of having recognized first the possibility of the escape of endometrium from the fimbriated ends of the fallopian tubes. He has shown, conclusively, it seems, that the endometrial particles thus escaping usually tend to drop on the ovaries and to develop as implants, growing into the ovarian tissue, which acts as a brood depot. During the process of growth of the endometrial implants small cysts develop. These cysts usually contain old blood (hence called chocolate cysts) because the endometrial implant functions just as does the normal

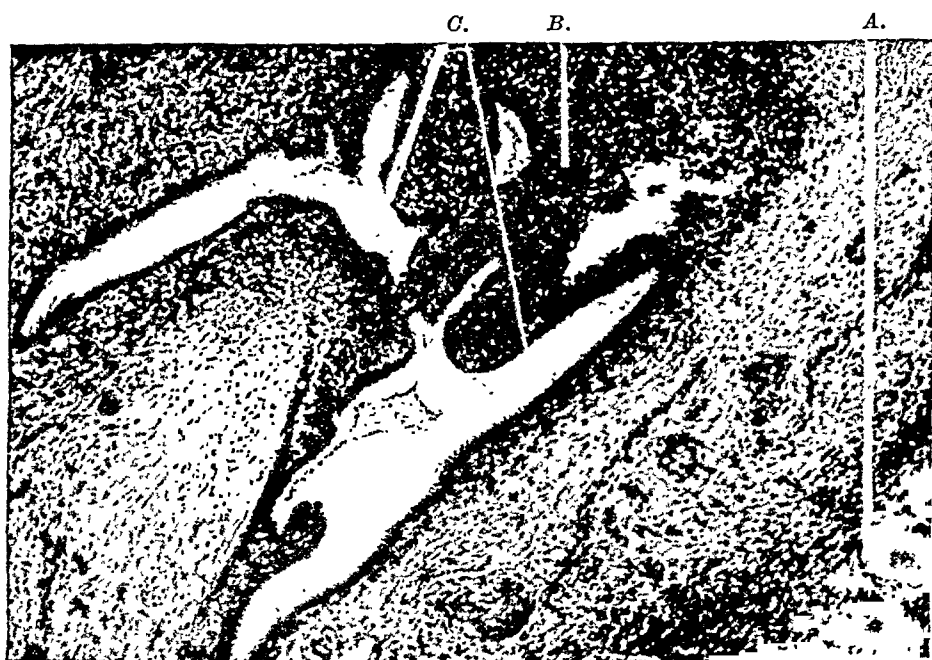


Fig. 5.—Well developed endometrial tissue just beneath lumen of appendix. Note the ciliated epithelium lining the glands. A, Lumen of appendix; B, stroma; C, uterine gland.

uterine endometrium. The chocolate cysts tend to rupture and to discharge their endometrial lining into the peritoneal cavity. Finding a new site on the serosa of the intestinal tract, the implants take on new growth and develop into the intestinal adenomas of endometrial type. It is possible for intestinal implantation to occur without the intervening agency of the ovary.

It is not without interest to note that Sampson published his first studies in 1921,³ and then followed them up with papers in 1922.⁴ In 1925 he published his most recent studies of carcinoma originating in endometrial implants.⁵ As early as 1899, Russel described the presence of endometrial tissue in the ovary, and in 1905 Pick lent emphasis to the subject by publishing four cases of his own. The German gynecol-

ogists and pathologists then worked over the field very thoroughly with the result that there were established two theories to explain the phenomenon of endometrial growth in the ovary. One school contended that anomalies in muellerian duct development were responsible for the condition, and the other school believed that the germinal epithelium of the ovary had the power to produce endometrium postnatally. The German investigators have rather unyieldingly refused to accept Sampson's views, but there seems to be a tendency now to veer toward Sampson's theory. For instance, Lauche⁶ in a very recent article reverses himself and says, "We may agree with Sampson that all intraperitoneally situated growths that resemble uterine mucosa and that are not real tumors (adenomyomata) may be regarded as implantations of uterine mucosa." Very recently, Halban⁷ advanced a new theory to the effect that the uterine mucosa elements burrow into the lymphatic spaces and are thence distributed intraperitoneally by the lymph route.

In view of the fact that this report represents only the sixth recorded case of endometrial adenoma of the appendix, it is not possible to construct a very clear-cut picture of the disease, to serve as a guide in recognizing it. Judging, however, from the admirably detailed study by Sampson,⁸ it seems safe to assume that, by being on guard, we shall recognize it in many more instances than we have in the past.

The treatment of endometrial implants in the appendix is complicated by the fact that Sampson believes that in cases of intestinal endometrial adenomas, the uterus, tubes and ovaries should be removed when they show evidences of being the site of coincidental implants. He leaves the intestinal lesions untouched, because symptoms due to the growth of the implants cease after the menopause. The wise course, it seems to me, in cases of the involvement of the appendix, with only insignificant lesions in the genital tract, would be to remove the appendix and to treat the demonstrable genital lesions as conservatively as possible.

CONCLUSIONS

1. Endometrial adenoma of the appendix is probably a more common disease than the few recorded cases warrant.
2. It may so closely resemble carcinoma, microscopically and clinically, that it is imperative for surgeons to learn to recognize the lesion.
3. The characteristic features of the disease are: (1) its exclusive occurrence in women; (2) the age incidence of from the thirtieth year to the age of the menopause; (3) the accompanying lesions of genital tract, rectum, sigmoid and higher intestinal tract; (4) the history of sterility, acquired painful menstruation, symptoms of chronic intestinal obstruction and acute exacerbation of pain at the menstrual periods, and (5) the tendency to spontaneous regression after the menopause.

4. Microscopically and macroscopically, the distinguishing morphologic features of the disease cannot be mistaken if one has familiarized himself with the appearance of them.

5. Treatment consists in removal of the appendix, extirpation of implantation foci in the genital tract (if necessary panhysterectomy).

REFERENCES

- ¹Ewing, James: Neoplastic Diseases, 1922, p. 666.
- ²McWilliams, C. A.: Amer. Jour. Med. Sc., 1908, cxxxv, 882.
- ³Sampson, J. A.: Arch. of Surg., 1921, iii, 245.
- ⁴Sampson, J. A.: Arch. of Surg., 1922, v, 217.
- ⁴Sampson, J. A.: Bost. Med. and Surg. Jour., 1922, clxxxvi, 445.
- ⁴Sampson, J. A.: AMER. JOUR. OF OBST. AND GYNEC., 1922, iv, 5.
- ⁵Sampson, J. A.: Arch. of Surg., 1925, x, 1.
- ⁶Lauche, A.: Deutsch. med. Wehnschr., May, 1924, p. 595.
- ⁷Halban: Cent. f. Gynak., 1925, No. 7, p. 387.
- ⁸Sampson, J. A.: Arch. of Surg., 1922, v, 217.

UNIVERSITY CLUB BLDG.

NOTE: Since the manuscript of this paper was submitted Outerbridge has reported four cases of possible endometriosis of the appendix (AM. JOUR. OF OBST. AND GYNEC., October, 1925, p. 545) and Sampson has urged the similarity of channels involved in the dissemination both of cancer and endometrial tissue. (Ibid., p. 649.)

EXTRAMEATAL PROLAPSE OF THE URETHRA, WITH THE REPORT OF A CASE HAVING AN ACUTE ONSET*

BY WALTER T. DANNREUTHER, M.D., F.A.C.S., NEW YORK

(Professor of Gynecology, New York Post-Graduate Medical School and Hospital)

THE terms "prolapse of the urethra" and "urethrocele" have been used interchangeably by various authors in referring to two quite different lesions. Literally, each may imply "the falling down or sinking of the part or viscus."¹ Herniation of the urethral walls through a rent in the urethrovaginal fascia frequently occurs as a result of the traumatism of labor, and although in a recent article Watkins² alludes to this condition as a prolapse of the urethra, it would seem more logical to speak of it as a supravaginal urethrocele. Dorland interprets the word urethrocele to mean either a diverticulum of the urethral body encroaching upon the vaginal canal or a prolapse of the urethra through the meatus urinarius. Extrusion of the mucous membrane through the meatus is more unusual than the supravaginal sagging, and to distinguish the one from the other I would suggest that the circumferential protrusion be designated as an extrameatal prolapse. The confusion in nomenclature may henceforth be avoided by qualifying the urethrocele or prolapse by the words "supravaginal" or "extrameatal."

The supravaginal displacement appears beneath the symphysis, involves all the walls of the canal, and is the prototype of a cystocele.

*Read before the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Hot Springs, Va., September 16 to 18, 1925.

Since it occurs so often after labor, either because of trauma, malnutrition, or chronic cystitis with residual urine, the etiologic factors concerned in its production are evident. On the other hand, when the urethral mucosa becomes everted and rolls out through the meatus, there is increased mobility of the inner tube (mucous membrane) only, and as this condition is seen occasionally in little girls and nulliparous women, its development cannot be attributed to the same causative alterations. Stöckel³ believes that the detachment of the mucosa may be due to atrophy of the underlying stroma. I have observed a number of cases of extrameatal prolapse in which a concomitant hypertrophy of the labia minora was noted, suggesting the likelihood of masturbation

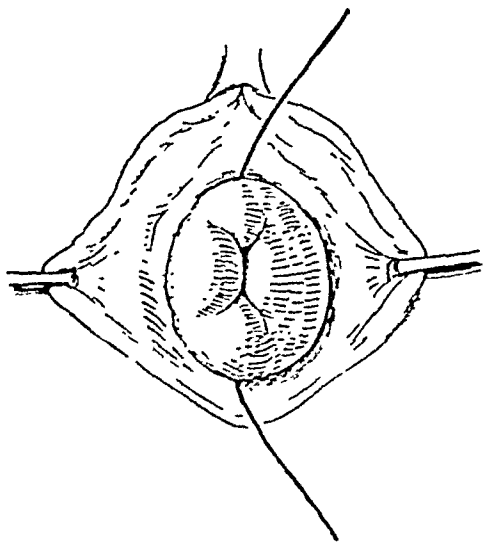


Fig. 1.

Fig. 1.—The silk transfixion suture passed through the base of the tumor and urethral lumen, immediately in front of the meatus.

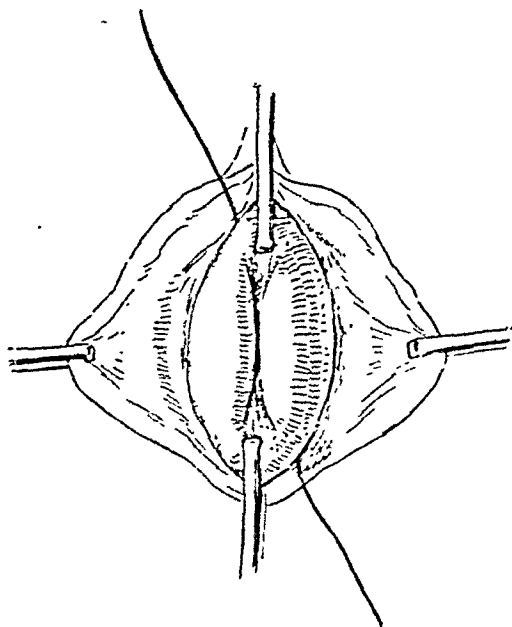


Fig. 2.

Fig. 2.—Stretching the urethral canal to make sure that the transfixion suture is properly placed.

as an exciting cause. In most instances the extrusion of the mucous membrane progresses insidiously, and the lesion is chronic when first seen. Acute cases, with strangulation of the prolapsed tissue at the meatus, are comparatively rare. The histopathology of a recent specimen arouses the suspicion that in cases with acute onset the pathogenesis may be somewhat analogous to that of hemorrhoids.

N. S., a spinster, fifty-four years old, a domestic by occupation, residing in another city, was seized with a sharp pain in the region of the vulva at 2 P.M. on May 9th, 1925. The attack was not preceded by undue physical exertion, although constipation had been obstinate for many years. There was extreme urgency and

increased frequency of urination, but only a few drops of urine were voided at each effort. On admission to the hospital at 5 P.M., examination disclosed the presence of a large tumor, projecting 52 mm. from the vulva and surrounded by the labia. It was 45 mm. in diameter at its widest part. The livid color, delicate surface, and the presence of a slit in its center through which a catheter could be passed into the bladder, identified the tumor as the urethral mucosa extruded through the meatus. The hymen was intact.

In the hope of reducing the size of the congested mass so that replacement might be attempted, the patient was put to bed; hot, wet compresses were applied constantly; the diet was restricted to fluids, and the bowels were cleared with enemata. These remedial measures neither afforded the patient symptomatic relief nor lessened the tumefaction to the slightest degree. In fact, the surface color gradually became darker, indicating necrosis.

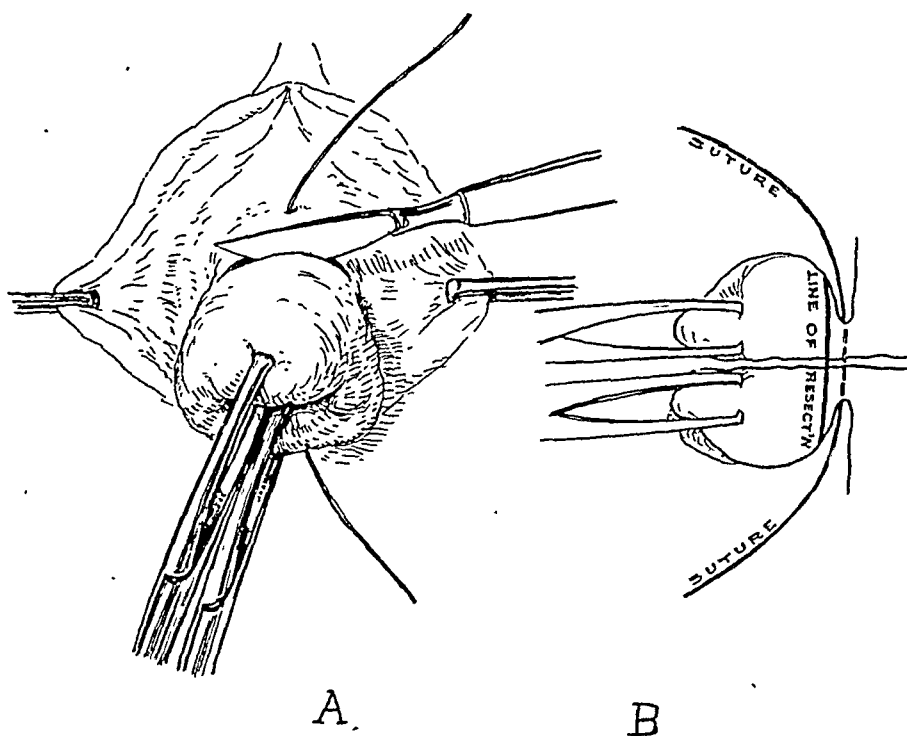


Fig. 3.—Resection of the prolapsed tissue. A, Shows the incision begun on the anterior surface; B, the line of resection.

On May 12 the tumor was resected, following the technic recommended by Ashton.⁴ The prolapsed mucous membrane was grasped with Allis clamps and drawn forward. A silk ligature was then passed through the upper edge of the external meatus, directly across the canal, emerging at the lower margin of the urethral opening (Fig. 1). The orifice was stretched open by means of the clamps, to make sure that the silk thread traversed the lumen of the urethra (Fig. 2). The redundant tissue was cut away in front of the ligature (Figs. 3 and 4), and the transfixion suture pulled out of the urethral canal with forceps. This loop was cut (Fig. 5), leaving two sutures which controlled the edges of the wound at opposite points and prevented retraction of the mucosa (Fig. 6). The circumference of the external meatus was then sutured with interrupted catgut stitches, approximating the severed mucous membrane and the margin of the urethral opening (Fig. 7). A Pezzer catheter drained the bladder for forty-eight hours. Although the patient was permitted to void thereafter, 2 or 3 ounces of residual urine were recovered by catheterization after spontaneous urination for several days.

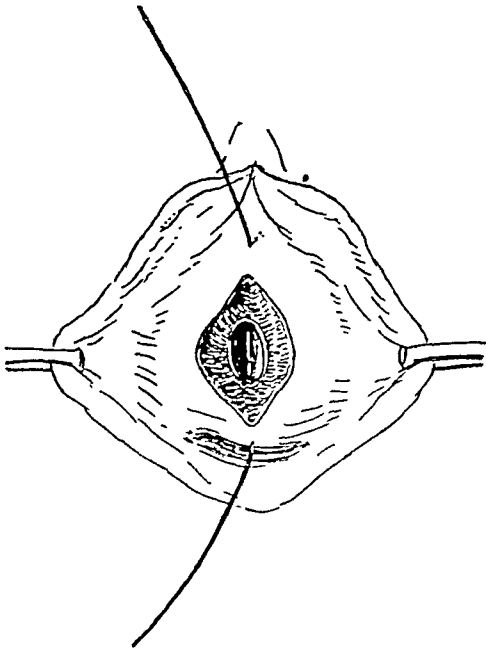


Fig. 4.

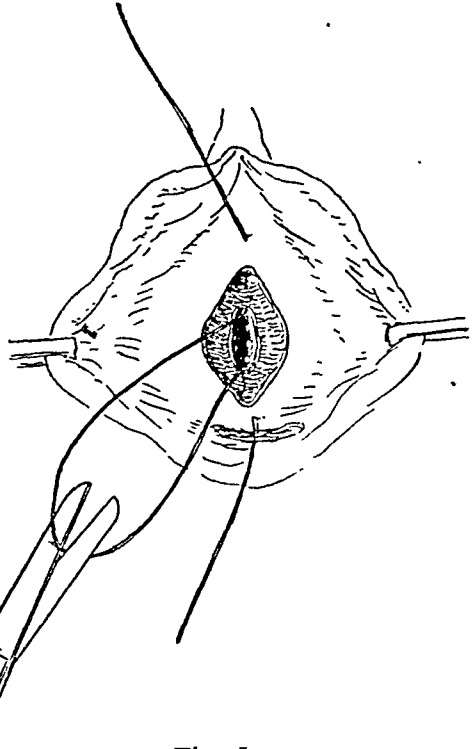


Fig. 5.

Fig. 4.—The redundant tissue cut away.

Fig. 5.—The transfixion suture pulled out of the urethral canal and divided.

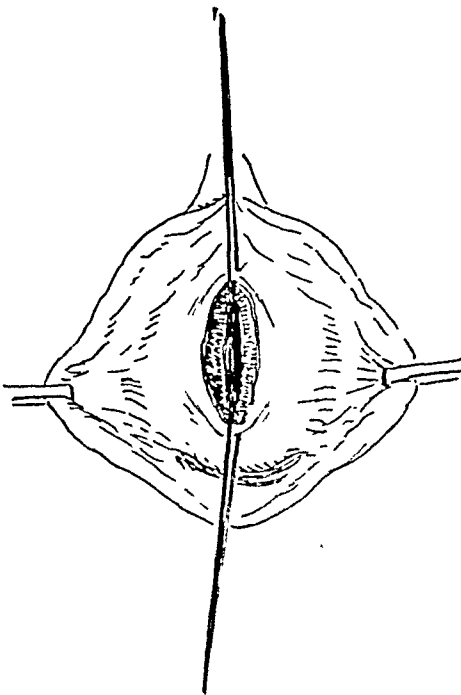


Fig. 6.

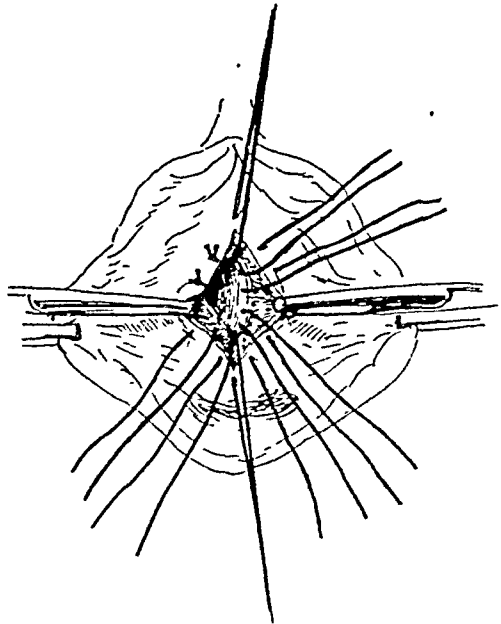


Fig. 7.

Fig. 6.—Preventing retraction of the severed mucous membrane by means of the two loops of silk.

Fig. 7.—Suturing the circumference of the meatus with interrupted chromic catgut stitches.

Hexamethylenamine and sodium benzoate were prescribed for one week. Recovery was uneventful and the patient free from symptoms when she left the hospital on the twelfth day.

Pathologic Report.—The specimen is an oval piece of tissue measuring 20 x 18 x 17 mm. On gross examination, it is seen to be extensively hemorrhagic, and shows marked thrombosis of the blood vessels.

On one edge, the sections show transitional epithelium, with superimposed red blood cells, polynuclear leucocytes, and desquamated epithelial cells. Most of the surface, however, is denuded of epithelium. In the center of the sections there is a slit, lined by several layers of transitional epithelium, evidently the urethral ostium. Beneath this epithelial lining there are three glandular structures on one margin, apparently Skene's glands. The underlying stroma is extremely edematous, the fibrous connective tissue being heavily infiltrated with polynuclear leucocytes, lymphocytes, plasma cells, large mononuclear wandering cells, and extravasated red



Fig. 8.—Cross section of the urethral tumor, showing the tremendously engorged blood vessels containing organized thrombi.

blood cells. The most striking feature of the microscopic picture is the enormous number of blood vessels, which resemble sinuses and are separated by narrow strands of connective tissue. They all show engorgement and beginning organization of thrombi. In some portions of these sinuses the epithelial lining is clearly recognizable, in some it is proliferated, and in others it is completely destroyed and the wall is infiltrated with polynuclear leucocytes. The histologic picture is quite similar to that of hemorrhoids (Fig. 8).

Comment.—In this case no causative factor to account for the sudden extrameatal urethral prolapse other than chronic constipation could be discovered. At the same time, it is interesting to note that the patient did not suffer from hemorrhoids.

The most important detail of the operative treatment of prolapse of the urethra is the placing of the transfixion suture, to prevent retraction of the mucosa after the tumor is resected.

An in-dwelling catheter helps to maintain the patency of the urethral canal during the first few postoperative days, and the bladder should be catheterized occasionally thereafter. Otherwise residual urine may accumulate.

REFERENCES

- ¹Dorland, W. A. N.: The American Illustrated Medical Dictionary, Ed. 11, 1922, W. B. Saunders Co.
- ²Watkins, Thomas J.: Surgery, Gynecology, and Obstetrics, xl, No. 5, p. 687.
- ³Stöckel: Veit's Handbuch für Gynäkologie, ii, 287.
- ⁴Ashton, William E.: Practice of Gynecology, Ed. 6, 1916, W. B. Saunders Co., p. 613.

580 PARK AVENUE.

(For discussion see page 522.)

WEIGHT ESTIMATES DURING PREGNANCY AND THE PUERPERIUM*

BY WILLIAM KERWIN, M.D., F.A.C.S., ST. LOUIS, MO.

OBSERVING the weight gain in the pregnant woman should no longer be a question for discussion among obstetricians, as its value has been definitely established by the work of several recent observers. The state of health coincides fairly accurately with the weight in the nonpregnant state, and in pregnancy this holds more or less true, although variations within physiologic limits occur. The patient's attitude towards prenatal care is determined by the interest which the obstetrician shows in her general state of health, and there is no better way to stimulate this interest than to observe, at regular intervals, the weight gain the patient is making.

In the nonpregnant state, a woman gives considerable thought to her physique, but when pregnant, she slumps to a considerable degree and awakes with a much altered postnatal figure. The sagging breast, wrinkled bosom, bulging hips, pendulous abdomen, etc., are conditions to which pregnancy fat makes a liberal contribution. A too rapid gain in the late months may be a factor in the toxemia of pregnancy. Among those who have made a study of weights during pregnancy are Gassner, Zangemeister, Lorenzen, Nebel, Baumm, Heil, Kruger, Momm, Kemper, Davis, Hannah, Smith, and Randall.

Gassner was interested in showing that gain in weight throughout the terminal months of pregnancy is within physiologic limits. Zangemeister found that the weight increases progressively from the twenty-seventh week to the end of pregnancy, and states that "the average increase from the twenty-seventh to the fortieth week is 5.55 kilograms, 405 grams per week or 55 grams per day. The greatest weight is attained three days previous to delivery, although some patients make this weight at an early date. During the last few days of pregnancy there is a decided decrease in weight in about 98 per cent of the cases, and this foretells the

*Read at a meeting of the Gynecological Society, St. Louis, Mo., December 11, 1925.

onset of labor. Multipara and primipara increase equally and the terminal fall is equal. The increase in heavy women is more than in light women. The increase and decrease depend on many factors; such as, age, size of fetus, etc; the increase is not only caused by the growth of the ovum, but the organism as such increases."

The decrease in weight is caused by processes in pregnancy and in the organism, and not alone by the loss of the ovum and the cause has not been determined. An increase in diuresis has been observed at this time. Intrauterine death of the fetus causes decrease in weight.

Lorenzen found the average weight gain after the thirty-first week to be 69 gm. per day. In the last four weeks the increase is greater than during any previous month. Maximum weight is attained two days before delivery. He states, "there are three types at the end of pregnancy: (1) Body weight increases up to the end of pregnancy without any terminal decrease. (2) Weight attains greatest height shortly before birth and decreases, (a) continuously up to delivery or (b) remains same. (3) Weight increases up to three days previous to delivery and then falls decidedly."

Fat women increase more than lean. Multiparae increase more than primiparae. Davis gives an average weight loss of fifteen pounds following delivery. He considers a weight gain of seven and a half pounds per month during the last three months as excessive, and the weight should be controlled. A rapid weight gain is a forerunner of eclampsia.

Hannah diets patients to control weight gain, because he considers it dangerous to mother and child when weight gain is excessive. Smith concludes, after an investigation of 3721 records from London Hospitals and 2441 from Dublin Hospitals, that a state of bad nutrition of the mother at the time of labor, due to insufficient foods greatly increases the per cent of stillbirths and premature births; greatly decreases the average weight of full-term babies at birth; definitely increases the postnatal infantile mortality; has little if any effect on the progress of babies during the first eight or ten days of life and possibly increases the death rate of babies during the first three days of life. A state of good nutrition, on the other hand, considerably increases the average weight of full-term babies and also the percentage of mothers able to suckle during the first eight or ten days.

The figures on the whole suggest that average nutrition of the mother is the most favorable condition.

Randall found that a too rapid gain in weight during the last two months of pregnancy occurred in a series of twelve patients with toxemia.

It has interested us to watch the increase in weight during the different trimesters and the decrease that takes place during the first two weeks following delivery and the decrease that occurs during the normal puerperium. Several hundred records of cases coming to the Cass Avenue Prenatal Clinic were reviewed to obtain the following data: The average gain from the end of twelve weeks to the end of twenty-four weeks in 260 cases was eight and one-half pounds. The average gain from the twenty-fourth week to the end of pregnancy in 127 cases was seven and one-half pounds. The average gain from the third month of pregnancy to the end in 147 cases was sixteen and one-half pounds. The average loss during the six weeks following delivery in 152 cases was sixteen and one-third pounds.

These weights were taken from records of patients of all nationalities, most of whom belong to the laboring class. The average loss in weight

during the two weeks following delivery in 73 hospital cases of the more leisure class was twenty pounds. These weights were taken at St. Mary's Hospital at the onset of labor and again two weeks later when the patient was discharged. The figures indicate that the loss for the first two weeks following delivery is greater than during the six weeks following delivery; in other words, the patient regains some of the weight loss which must be attributed to the inactivity of the body while at rest in bed. There are no figures to cover the change in weight during the lactation period, but this, needless to say, would be greatly influenced by the diet, the activity, and the environment of the patient and the vigor of the child.

The greatest weight gain from the twelfth to the twenty-fourth week was twenty pounds in a patient weighing 139 pounds at the end of the twelfth week, attaining a weight of 159 pounds at the end of twenty-four weeks. The smallest gain during that period was one pound in a patient weighing 193 pounds at the end of twelve weeks and 194 pounds at the end of twenty-four weeks. This patient was on a diet low in fats and sugars. In the series between the twenty-fourth week and the end of pregnancy the greatest weight gain was 26 pounds in a patient who weighed 152 pounds at the end of twenty-four weeks, and 178 at the end of pregnancy. One patient in this series, weighing 230 pounds at the end of six months, weighed 231 pounds at the end of pregnancy. This patient was subjected to a diet low in fats and sugars. The greatest gain from the twelfth week to the end of pregnancy was 38 pounds in a patient weighing 142 pounds at twelve weeks and 180 pounds at the end. The smallest gain during that period was six pounds in a patient weighing 109 pounds at twelve weeks and 115 pounds at the end. When the weight was excessive for the height of the patient, diet was instituted with the hope of controlling the gain as far as possible. In private practice with the patient under better control this could be accomplished in practically all cases. It was apparent that the patient felt decidedly better if the weight gain was kept low, providing the initial weight was above par.

The greatest loss during the first two weeks following delivery was 36 pounds in a patient who weighed 176 pounds at the end of labor and 140 pounds two weeks later. The smallest loss was 7 pounds in a patient weighing 125 pounds at the onset of labor and 118 pounds two weeks later. One patient weighing 182 pounds at the onset, however, weighed 174 pounds two weeks later, a loss of 8 pounds, so that the weight of the body and the size of the ovum do not necessarily determine the amount of weight loss. During six weeks of the puerperium the greatest loss was 31 pounds, in a patient weighing 183 pounds at the end of pregnancy and 152 pounds six weeks later. One patient weighed 113 pounds at the end of pregnancy and weighed the same six weeks later,

while another weighing 168 pounds weighed 166 pounds at the end of six weeks.

It would be rather difficult to chart the individual cases showing small losses and great losses, but the series show that certain facts are apparently true, namely: That the loss in weight during the puerperium is not solely influenced by the weight of the ovum, by lactation, or by the weight of the body at the onset of labor. It therefore must be a combination of these factors, with environment, diet, and exercise playing important rôles.

The gain in weight is not effected in all cases by the growth of the ovum, as it can be definitely controlled through diet, exercise, etc. Edema no doubt plays a very important rôle. Needless to say, the patient who has lost considerable weight during the early months as a result of nausea and vomiting, will regain weight rapidly after these conditions have passed, and this she should be permitted to do. It is not advisable so to restrict the diet that the fetus is deprived of ingredients necessary for its development, although there is some doubt as to whether these products are procured through the diet of the mother, or can be obtained in sufficient quantity from the mother's tissues. Figures compiled during the starvation period of the war suggest that the fetus is capable of normal development regardless of the mother's diet.

A summary of the above facts and the work of others force the following conclusions:

1. Obesity is pathologic in pregnancy as well as in the nonpregnant state.

2. It can and should be controlled through diet and exercise.

3. Excessive weight gain is detrimental to both mother and child.

4. The weight gain is about equal in the second and in the third trimesters. (The rapid gain in the second trimester is probably due to the fact that the patient enters the second trimester with a weight below normal, brought about by the disturbance in digestion which frequently exists in the first trimester.)

5. The weight loss for the puerperium about equals the weight gain made during pregnancy.

6. The greatest loss occurs during the lying-in period, and this loss is not due solely to the loss of the ovum.

7. More consideration should be given to the future health and physique of the pregnant woman. Improvement in these conditions can be obtained through the control of pregnancy fat.

REFERENCES

- Baumm: Diss. München, 1887. Zcit, Winkels Handbuch.
Davis: AMER. JOUR. OBST. AND GYNEC., 1923, vi, 575-587.
Gasner: Monatschr. f. Geburtsh., 1862, xix, 1.
Hannah: Texas State Jour. of Med., 1923.

- Heil: Arch. f. Gynäk., 1896, li, 18.
 Kemper: Arch. f. Gynäk., 1924, 121-268.
 Kruger: Zentralbl. Gyn., 1807, xiii, 237.
 Lorenzen: Ztschr. f. Geburtsh. u. Gynäk., 1921, lxxxiv, 426.
 Morrm: Zentralbl. f. Gynäk., 1920, p. 233.
 Nebel: Med. Klin., 1922, xviii, 339.
 Smith: Lancet, London, 1916, cxcii, 54.
 Zangemeister: Ztschr. f. Geburtsh. u. Gynäk., 1919, lxxxi, 491.

LISTER BUILDING.

INJURIES OF THE INFANT DURING DELIVERY*

BY P. BROOKE BLAND, M.D., PHILADELPHIA, PA.

(From the Department of Obstetrics, Jefferson Medical College.)

IN ANALYZING the theme assigned to me, I was carried in retrospect to the winter of 1907. It was my good fortune to spend several hours of each day with Dr. Störk, one of the pathologists in the Allgemeines Krankenhaus, in Vienna. Here it was not uncommon to witness from ten to fifteen or more autopsies almost every day. Adult autopsy material was always abundant, it being the rule that all patients dying in the institution be subject to postmortem investigation. Daily I observed large numbers of bodies of newborn babies in the morbid anatomy room, but in these, routine postmortem studies were not made. Naturally, I was led to speculate as to the cause of fetal death. The question arose as to whether all were inevitable and whether some, at least, were not preventable.

In recent years, the question of fetal injury and fetal death has been receiving more and more the long deferred attention it justly deserves. Noteworthy strides have been made in maternity work, but the high plane on which practical obstetrics should stand has not been attained. In this country, there is something woefully wrong, since from the standpoint of obstetric mortality, we stand fourteenth in the sixteen leading nations of the world. In New York City, according to Polak, "one baby out of every twenty-one is born dead and one out of twenty-six dies before it is one month old, while one mother in every two hundred and fifty deliveries dies from infection or as an indirect cause of it." This author further claims that more than 61 per cent of all gynecologic surgery is a result of poor obstetric practice. Dr. Barton Cooke Hirst, five years ago, in a paper entitled: "The Obstetrical Department of a Modern Medical School," drew attention to the defects in the teaching and practice of obstetrics in America. In Pennsylvania, the maternal mortality has not changed in the past seventeen years. The mortality was 6.1 per cent per thousand in 1906, and it was precisely the same in 1923. Twelve hundred and fifty-one mothers died in confinement in 1922, and the toll in 1923 was 1,373.

*Read at a meeting of the Philadelphia Obstetrical Society, November 10, 1925.

It is impossible to compute the vast multitude of women rendered physically incompetent or at least partially handicapped by complications arising in both pregnancy and labor. *I believe that no other function performed by the human organism exacts such an enormous penance in morbidity and mortality as does pregnancy with its culmination in labor.* It is said to stand second to tuberculosis as a cause of death in women between the ages of fifteen and forty-five.

When the true status of obstetrics as a major surgical specialty is accorded the place it should rightfully own, the illusive term "physiologic process" will no longer hold as a common medical phrase, since in so many instances pregnancy, with its consummation in childbirth, becomes a pathologic problem.

It may not be prudent to deal in prophecy, but it seems reasonably safe to assert that 50 per cent or more prospective mothers will inevitably suffer with some type of physical incompetency, often of a most subtle form. With this knowledge gradually becoming ingrained in the mind of the profession, expectant mothers will receive the long deferred antepartum, intrapartum, and postpartum care their condition demands.

Statistics disclose that from 3 to 5 per cent of all babies die during delivery. It is estimated, according to the United States Department of Labor, Children's Bureau, that in this country the annual death rate of babies less than one year old, including stillbirths, totals 300,000. It is authoritatively stated that at least 50 per cent of these deaths (150,000) are wholly unnecessary. This report further shows that slightly more than 42 per cent of the babies dying under one year of age did not live to complete the first month of life. Of the 42 per cent mentioned, seven-tenths died as a result of antenatal conditions or from accident or injury sustained at the time of birth. Of the babies who lived less than one week, 83 per cent died of the causes mentioned, and of those that lived less than one day, the causes named were responsible in 94 per cent of cases.

While statistics provide fairly reliable data respecting fetal death in its relation to pregnancy and parturition, statistics cannot compute, nor can the human mind fully comprehend the vast army of infants left physically disorganized or mentally crippled; herein lies the dark tragedy of childbirth.

Fortunately, in recent years, this catastrophe affecting the human family is receiving more and more attention. Ehrenfest says: "Wider interest in the causation and prevention of parturitional injuries of the infant, while of relatively recent date, is growing rapidly and is obvious to anyone conversant with modern obstetrical literature." Again, "Today we are facing the surprising fact that in at least 40 per cent of the autopsies properly performed on stillborn infants and

those dying within the first few days after birth, some sort of intracranial lesion is found."

In this connection, it may be of interest to cite the status of obstetrics, especially as regards the welfare of the child, in countries other than our own. A relatively high puerperal infant morbidity and infant mortality is not restricted to any nation on earth.

In England, according to Holland, infant mortality has been reduced one-half in the past twenty-two years, or from 154 per thousand in 1900 to 77 per thousand in 1922. The number of deaths occurring in the first four weeks postpartum, however (neonatal mortality), has shown only a slight decline. Holland points out that nearly one-half of the deaths "occurring" during the first year of life "occur" during the first month and nearly one-half of these "occur" during the first week. It has been shown clearly by Holland, that the large proportion of these are due to obstetric accidents or obstetric injuries.

An analysis of the possible injuries to which the infant is exposed during delivery discloses that damage may be inflicted anywhere from the cutaneous envelope (the omnipresent caput succedaneum) to the mucous lining, including in the area between the bony architecture and the parenchymatous organs as well.

The most serious damage, both in its immediate and remote results, is that sustained by the cerebrospinal system.

Schwartz, in a series of investigations on newborn infants asserts that the pathologic conditions arising in the first month of neonatal life are dominated by injuries sustained by the brain during labor. Fischer, from postmortem studies, found that 10 per cent of the deaths occurring in the newborn during the first four weeks postpartum, were the result of cerebral damage inflicted at the time of birth.

Before considering this phase of parturitional damage, I wish to direct attention to the possible trauma inflicted to the buccal mucous membrane by the method customarily employed in removing secretion from the baby's mouth. Manual removal with the gauze-enveloped finger must inevitably traumatize, more or less, the mucous membrane. With the mucosa broken, infection is certainly possible, since it is well known that the mother's milk contains a wide variety of bacteria, including staphylococci, colon bacilli, and, in as high as 49 per cent of cases, streptococci. Fortunately, only 2 per cent of the latter are found hemolytic. Furthermore, it is equally well known that shortly after birth myriads of bacteria appear in the baby's mouth. To exclude or minimize the possibility of buccal infection, we have abandoned the usual plan of cleansing the mouth and are now using in the Jefferson Maternity Hospital an electric aspirator, fashioned after the aspirating device commonly used by the laryngologist. This method is on trial, and whether or not it will afford any

safeguard against infection, only a fair test will tell. The method will at least keep traumatizing fingers out of the baby's mouth.

• Another condition, though not strictly an injury, yet one which may legitimately be placed in the category of birth accidents, is infection of the stump of the umbilical cord. Some authorities consider such infection responsible for as high as 10 per cent of the mortality of infants less than one month old. What part the constantly soiled silk braid commonly used in ligating the stump plays in acting as a culture medium, one cannot say. It may have an influential rôle and it may not, though the method does not rest upon sound surgical grounds. Recently, we devised a "metallic ligature." This is composed of German silver and it is now used instead of ordinary silk braid. Whether or not it provides the bactericidal power silver is thought by some to possess or any other advantage over the old method, remains for further study alone to reveal. It does exert constant pressure and hemostasis is assured. It does not cut the cord, no tying is required, and it may be used, always resterilized, a great many times. It is inexpensive and may be purchased at a cost not exceeding ten cents.

Passing now to the serious accidents and injuries of parturition, I shall briefly consider those affecting certain nerves, the spinal cord, and the brain. To these special types of birth injury considerable attention has been directed during the past few years.

Trauma, according to Von Reuss, results either from trouble in the genital passage of the mother, or from obstetric maneuvers, either manual or instrumental. In artificial deliveries it is either manual manipulation in breech or transverse presentations (version and extraction) or the obstetric forceps which damage the child. In spontaneous delivery the cause lies chiefly in disproportion between the child and the mother's pelvis, in pelvic deformities, or in malpresentations.

Damage may occur particularly after long labors and also in precipitate labor in which the child is forcibly driven through the pelvic canal. While it is well to recall that almost all forms of injury to the child may arise during spontaneous or normal delivery, the large proportion of injuries occur after difficult manual or instrumental labor. It is of interest to note at this time that accumulated evidence tends to disclose that conditions heretofore regarded as congenital are in reality late expressions of damage sustained during birth, conditions which, in the beginning, did not give rise to prominent symptoms and which were undetected because of indifferent care or lack of knowledge on the part of the obstetrician.

The late recognition of many birth injuries may probably be attributed to the attendant, who regards his obligation discharged when the umbilical cord is tied and dressed. We should not leave the patient with the assumption that our duty ceases with the birth of the

baby. In order to afford every possible safeguard for the child, those born in our department in Jefferson Hospital are placed under the immediate care of a competent pediatrician. This ideal method is not practicable in general work, but it should constitute a routine feature of neonatal work in institutional practice.

NERVE INJURIES

Parturitional nerve injuries are limited almost exclusively to the facial and brachial plexus. These are nearly always the result of complicated labors and usually of artificial deliveries. E. Stransky analyzed 94 case records of birth palsies which he collected from the literature. In these the type of delivery was as follows:

Manual assistance (Extraction, freeing of arm),	50 cases.
Forceps,	31 cases.
Protracted and difficult labor,	27 cases.
Asphyxia,	11 cases.
Spontaneous labor,	2 cases.

While nerve injury may occur in all varieties of presentations, most authorities believe that the Duchenne-Erb type of palsy, which involves the fifth and sixth cervical nerves, is found almost exclusively after breech presentations. This point, however, still seems open to controversy. Ehrenfest assigns direct pressure of a forceps blade as occasionally responsible. More frequently, he states, trauma inflicted in delivering the after-coming head is the causative factor. Respecting the mechanical factors as influential in obstetric paralyses, those upon which responsibility is usually placed are:

1. Direct compression, manual or instrumental.
2. Traction resulting in overstretching.
3. Traction causing plain tearing.
4. Compression or traction followed by blood extravasation or inflammatory disorganization.

Either of these destructive forces may follow the Prague or Mauriceau-Smellie-Veit method of breech extraction. Direct pressure by the tip of one blade of the obstetric forceps is said to be definitely causative in a certain number of cases, but this, according to Stolper (quoted by Von Reuss) is only possible when the forceps are applied to the head in oblique position or when the rules of proper application are not observed or deflection is overlooked. In certain cases serious nerve trauma has resulted from pressure of a hematoma, and even pressure of the umbilical cord may sometimes, though rarely, account for nerve damage in the region of the brachial assembly (Roulland). Pressure of the clavicle on the brachial nerves is said to be a cause in some cases, especially if the arm locks over the head in vertex presentation, and Dr. Burr, of Philadelphia, in 1920, referred to trauma of the cord itself as sometimes causative.

A paper by Gilmour recently appeared, reporting twenty-five cases of brachial birth palsy, of which twenty-three were of the Duchenne-Erb variety. Two were of the general arm variety, but there was no instance of a pure Klumpke type. As to the cause in these cases: all but three of the births were described as long or difficult, though in one case the period of labor was short, only lasting five or six hours. In two, delivery was natural and unassisted. In the rest, chloroform was used to facilitate instrumental or manual delivery. Three infants were said to have been asphyxiated and to have required prolonged resuscitation. The presentation was vertex in sixteen cases; breech in four cases and irregular in type in five cases.

Six forms of brachial plexus damage are described, according to the site and extent of the injury.

1. The most common form is the Duchenne-Erb type, in which the upper part of the plexus is affected. The damage involves the fifth and sixth cervical roots or the trunk formed by their union. Functional disturbance is observed in loss of power in the muscles about the scapula and arm, giving rise to the typical deformity in the arm, forearm, and hand, described sometimes as the "tipping" attitude.

2. Involvement of the eighth cervical and first thoracic nerves or the trunk formed by their fusion is usually described as Klumpke's type. Loss of function occurs in the muscles of the hand and also in the large flexor muscles of the forearm. The second thoracic root is sometimes affected, and, as a result, the muscles supplied by the musculospiral, the extensors of the hand and fingers, are also palsied. In addition, owing to the intimate relationship of the first thoracic to the sympathetic, changes in the oculopupillary reaction occur. Damage of the lower section of the plexus is followed by more extensive and serious paralytic disturbance than injury of the upper section.

3. In certain instances the damage of the plexus is more or less complete, resulting in loss of power of all of the muscles of both the arm and forearm. In this type serious bone lesions, it is claimed, are usually an accompaniment of the primary damage. Posterior subluxation of the humeral head has been pointed out as a cause by Thomas, of Philadelphia, and others.

4. In certain other cases there is a combination of the upper and lower types, with transition from partial to total paralysis.

5. In still other instances damage is more or less isolated and palsy of a single muscle, such as the deltoid or supinator longus, occurs.

6. The damage may involve both sides, resulting in a bilateral palsy, though this is extraordinarily rare.

Paralysis of the Lower Extremity.—Damage of the cord or lower spinal roots, resulting in paralysis of the lower extremities, is exceedingly uncommon. Von Reuss refers to a case of complete paraplegia. It existed from birth and was not associated with loss of sphincter con-

trol, thus indicating an injury involving the spinal roots of the second and fourth lumbar and the first and second sacral segments. Injury was thought to be caused, in this case, by excessive traction during delivery.

Obstetric Facial Paralysis.—From the obstetric standpoint palsy of the muscles supplied by the seventh nerve fall into two groups: those following spontaneous labor and those following manual or instrumental delivery.

In the first group injury is sustained only when there is frank disproportion between the diameters of the fetal head and the maternal pelvis. The trouble is seen chiefly in the various forms of contracted pelves, especially the flat pelvis, the head presenting transversely, with excessive cranial stress being directed from the sacral promontory, the symphysis, or an abnormal bony prominence. As a rule, the trouble arises after primary cephalic presentations, rarely after breech presentations.

The palsy may result: first, from damage in the central origin (basal) of the nerve; second, from injury of the cortical motor area; and, third, from damage of the peripheral portion of the nerve itself, especially that portion about or just beyond its emergence from the stylomastoid foramen, or of its branches. The palsy, therefore, may be the result of intra- or extracranial injury.

The third type of damage is by far the most common (this applies to the second group), resulting in most instances from direct pressure of a forceps blade. Some cases, probably a relatively large number, result from violent edema or a large blood collection following forceps trauma. At any rate, it is estimated that at least 10 per cent of the facial birth palsies follow difficult forceps delivery, and only occasionally is palsy observed after spontaneous labor.

The incomplete nature of the paralysis and the fact that in most instances the damage is not permanent is explained on the basis, first, that severe compression is not made on the trunk itself but on its branches, especially those coursing through the soft parotid gland; and, second, that damage of a temporary nature only is, therefore, sustained.

Von Reuss, whose work has been drawn upon constantly in the preparation of this paper, also directs attention to the temporary and incomplete nature of obstetric facial paralysis, and, owing to this feature of the disorder, he prefers the term "paresis" instead of "paralysis."

Intracranial injury of the nerve may be suspected if the characteristic signs of the facial palsy are associated with evidences of hypoglossal paralysis or a simultaneous palsy of the third nerve with ptosis of the eyelid.

Facial nerve palsies, like those involving the brachial plexus, are nearly always unilateral. Bilateral palsy is exceptional.

Since it is not possible to determine accurately the site and extent of injuries resulting in paralysis without postmortem investigation, we are naturally led to the study of lesions resulting in death.

One of the most noteworthy monographs on this phase of birth injury has been contributed by Eardley Holland, of London, England. This work was taken up under the auspices of the Local Government Board of London. It was begun in March, 1914, and the report was presented in March, 1922. It is based on the most painstaking autopsy studies of the bodies of three hundred newborn babies of viable age.

The examination was undertaken to determine the cause of death in "stillbirths."

In this report it is pointed out that death may occur at three periods:

A. Antenatal (when the fetus is usually macerated).

B. Intranatal, (during labor).

C. Postnatal, (when fetal heart beats at birth but respiration is never established).

The deaths were classified as accurately as possible, according to the primary causes, as follows:

1. Maternal states, such as syphilis and toxemias.

2. Complications of labor, such as deformed pelves and placenta previa.

3. Placenta states, such as retroplacental hemorrhage.

4. Fetal states, such as prematurity and deformities.

Among the actual causes of death, reference was made to the two conditions which were considered of special interest, namely: syphilis and excessive cranial stress; the first, because of its low incidence, and the second, because of its unexpected importance. By most writers syphilis is regarded as the most common cause of stillbirths, but, according to Holland's report, only a relatively small percentage can be attributed to this disease. His investigations respecting this feature of the studies were most complete, yet among the three hundred fetuses examined there were only forty-two cases of proved syphilis and six of probable syphilis, or 16 per cent in all. Fourteen cases were classed as possible syphilis, but in these there was no evidence of the disease in the fetus or placenta. The observations made with respect to excessive cranial stress, defined "as a compound compressive stress, roughly regarded as consisting of two elements, first, a general compression of the whole head and, second, a simple longitudinal compression by opposite forces, acting at the ends of the long diameter of the pelvis," and their bearing upon the use of forceps and the conduct of breech deliveries are exceedingly valuable and suggestive.

The effect of cranial stress upon the brain and membranes is discussed in detail, and many interesting theories regarding the effect of molding upon the cranium and its contents are presented. Of 167 fresh fetuses examined, the tentorium cerebelli was found torn in eighty-one (48 per cent); the injury was associated with laceration of the falx cerebri in five cases, and with subdural hemorrhage in all but six.

Of the eighty-one cases, forty-six were delivered by the head and thirty-five by the breech.

Forceps were used in twenty-five of the vertex presentations, the indications being: Contracted pelves, placenta previa and prolonged second stage. In some of the cases signs of considerable force having been employed were evident. Holland in this connection states: "while the forceps may save many lives it is also responsible for the unnecessary injury and death of many others."

The thirty-five breech deliveries represent 75 per cent of the total number of breech deliveries examined. The frequency with which the tentorium is torn during breech birth is due, in the opinion of Holland, to the haste customarily advised and employed in extracting the after-coming head. He urges a revision of obstetric teaching with respect to this procedure.

From this report it is apparent that more babies were killed by the complications of labor than died during pregnancy or from maternal or placental diseases.

The observations made by Holland regarding the incidence of fetal injury and fetal death in breech deliveries are in accord with those made by Pierson in the Sloan Hospital, New York.

This author reports 142 viable primary breech deliveries, with natal or neonatal death in eighteen, or 12 per cent. He also reports eighty-seven viable version and breech extractions with natal or neonatal death in eighteen, or 26 per cent. As regards the cause of death, Pierson found spinal cord hemorrhage in seventeen, or 47 per cent of the total of thirty-six cases. Fractures of the vertebrae were found in fourteen, or 38 per cent. Intracranial hemorrhage was present in 44 per cent, though this was marked in only 25 per cent.

In an analysis of the spinal fluid of 423 newborn negro babies, Roberts found that sixty, or more than 14 per cent, contained blood. In the sixty babies in whom spinal hemorrhage was found, the trouble was attributed to trauma in fifty-eight and to hemorrhagic disease in two cases.

Sharpe and MacLaire, in a series of noteworthy studies made of 400 newborn babies in whom spinal puncture was performed within twelve to forty-eight hours after birth, found evidence of excessive cranial stress by the presence of blood in the cerebrospinal fluid in from 7 to 13 per cent of the cases.

Spencer, in a study of 130 stillborn children, found intracranial hemorrhage in fifty-three or 40.7 per cent. Twelve of the babies were delivered by forceps, and in all of these hemorrhage was found. Wallich, quoted by Birnbaum, in 143 post-mortem studies of stillborn babies, found intracranial hemorrhage in fifty-eight, and Litzmann, also quoted by Birnbaum, found spinal meningeal hemorrhage in thirty-three of eighty-one autopsies performed on stillborn infants.

Sharpe and MacLaire, in a very recent series of one hundred spinal punctures performed on newborn babies, found blood contamination in six.

Pierson, in studying his series of cases with reference to the nature of delivery, encountered difficulty with the head in 57 per cent; with the arms and shoulders in 25 per cent; with the cervix in 11 per cent, and with the placenta and cord in 28 per cent.

This author points out that trauma alone was the probable cause of death in 56 per cent of the thirty-six cases. Asphyxia, thought to be the most prominent cause of death in breech delivery, was probably accountable in only 5 per cent. Trauma with asphyxia was thought responsible in 39 per cent. Pierson believes that birth injuries and shock following breech delivery cause a greater fetal morbidity and mortality than asphyxia. Accordingly he advises against unnecessary haste in breech extraction and indicates that hasty action, prompted by fear of asphyxia, is not justified. The diagnosis of death from asphyxia in breech deliveries, he claims, is only justified, first when, there is strong clinical evidence of asphyxia but none of injury, and second, when complete autopsy studies show characteristic signs of asphyxia, but none of injury.

In emphasizing the importance of undue haste in breech extraction, he refers to Potter and others who claim that from fifteen to twenty minutes may safely

be allowed to elapse in delivering the after-coming head. Potter has taken as long as twenty-three minutes in performing an extraction without injury to the child. Indeed, this well-known proponent of the operation of version, on more than one occasion, has even with safety delivered the placenta before the child.

From a study of injuries of the infant during delivery, it is observed that many are largely preventable. The means of prevention may be divided into: first, a wider adoption and higher standard of prenatal care and, second, more thorough intranatal training and better practice.

In conclusion, may I again quote from Holland, who says: "Antenatal methods are the strategy and intranatal methods the tactics of obstetrics." "Obstetrics," he states further, "is the Cinderella of medicine and she is only beginning to ascend to a proper position among her sisters."

REFERENCES

- Birnbaum, R.: Clinical Manual of the Malformations and Congenital Diseases of the Foetus, Translated by Blacker, J. & A. Churchill, London, 1912, 84-85.
- Burr, Charles W.: Am. Jour. Dis. Child., 1920, xiv, 473.
- Ehrenfest, Hugo: Birth Injuries of the Child, New York, 1922, D. Appleton & Co., p. 7.
- Fischer, B.: Schweiz. med. Wehnschr., October 2, 1924, No. 40, p. 905.
- Fischer, Prof. Bernh.: Das Geburtstrouma in seinen Folgen für Gehirn und Säugling, Schweiz. med. Wehnschr., Oct. 2, 1924, v, No. 40, o. s. 54, p. 905.
- Gilmour, John: The Lancet, London, October 3, 1925, No. 5327, ccix, 696.
- Gilmour, John: Notes on the Surgical Treatment of Brachial Birth Palsy, Lancet, Oct. 3, 1925, No. 5327, ccix, 696.
- Hirst, Barton Cooke: New York Med. Jour., November 6, 1920 cxii, 101.
- Litzmann: Clinical Manual of the Malformations and Congenital Diseases of the Foetus, 1912, J. and A. Churchill, London, p. 55.
- Pierson, Richard N.: Surg. Gynec. and Obst., October, 1923, 802-815.
- Polak, John O.: Jour. Am. Med. Assn., June, 1921, xvi, 1809-10.
- Potter, Irving W.: The Place of Version in Obstetrics, St. Louis, 1922, C. V. Mosby Company.
- Roberts, M. Hines: Jour. Am. Med. Assn., August 15, 1925, lxxxv, 500-502.
- Schwartz, P.: Deutsch. med. Wehnschr., October 3, 1924.
- Sharpe, Wm. and Maclaire, A. S.: AM. JOUR. OBST. AND GYNEC., April, 1925, xi, No. 4, p. 2-11.
- Sharpe, Wm. and Maclaire, A. S.: Surg., Gynec. and Obst., November, 1925, xli, No. 5, 583-588.
- Sharpe, Wm.: Northwest. Med., July, 1924, xxiii, 308-316.
- Spencer, Herbert: Trans. Obst. Soc., London, 1892, xxxiii, 269.
- Stranksy, E.: Zentralbl. f. d. Grenzgeb. d. Med. u. Chir. 1902, v, 497.
- Thomas, L. Turner: Am. Jour. Obst., 1916, lxxiii, 577.
- Von Reuss: The Diseases of the New Born, 1921, William Wood and Co., New York, p. 171.
- Wallich: Clinical Manual of the Malformations and Congenital Diseases of the Foetus, 1912, J. and A. Churchill, London, p. 83.
- West, Mrs. Max: Prenatal Care, United States Dept. of Labor, Children's Bureau, Pub. No. 4, 1924, p. 5.

VULVOVAGINITIS IN INFANTS AND YOUNG CHILDREN*

BY PHILIP F. WILLIAMS, M.D., PHILADELPHIA, PA.

VULVOVAGINITIS in infants and young children is one of the topics of common interest to the pediatricist and gynecologist. The importance of this problem and the difficulties encountered in solving it have been recognized for many years. Dr. Bedford, in a textbook on diseases of women and children in 1856, remarks concerning this topic, "that the diagnosis merits all the attention of the physician" and again "that often treatment is utterly unavailing."

The term vulvovaginitis is neither accurate nor sufficiently descriptive, for in the mild cases of vulvitis the vagina is rarely, at least markedly, involved; while in the prolonged complicated cases the many lesions to be met are not sufficiently covered. Kahn suggests this term be reserved for localized affections of the vulva and vagina, and that disease of the infant female organism, caused by the gonococcus of Neisser be designated as "gonorrhea puellarum."

There is doubt that a large percentage of the cases are caused by the gonococcus. Many outbreaks, especially of the epidemic type in babies' homes, schools and hospitals, are caused by the ordinary mucous membrane infecting organisms responsible for colds and upper respiratory infections. Masturbation prompted by mechanical irritation of undisturbed secretion about the labia and clitoris causes a certain percentage, and a flagrant disregard of cleanliness is the basic cause in many others. Contamination from the rectum to the delicate tissues anterior must be considered. Weakened resistance in poorly nourished or ill cared for children in the lower grades of society heightens the susceptibility to infection of the genital organs. Dissemination at times arises in birth infections, communal towels, toilets, baths and thermometers.

During the first twenty-four hours of life the vagina is said to be sterile, but by the third day it contains microorganisms. These include the various staphylococci, streptococci; later on the bacillus coli has been found, and in older children intestinal bacteria form about half the organisms present in the vagina. The finding of organisms so constantly in the vaginas of young children might negative the existence of a natural antiseptic function at this age. The vaginal bacillus of Doederlein is said not to appear until puberty; thus the vaginal canal in infancy does not have its later natural protective function.

The gonococcus has been recovered in smears in from 10 to 50 per cent of cases in various series, and in many cases in pure culture. In

*Read before the Philadelphia Obstetrical Society, meeting of November, 10, 1925.

a large group of cases streptococci of intestinal origin, colon bacilli, gram-positive bacilli resembling diphtheroids, and various types of gram-negative cocci form the bulk of the organisms present. Vulvovaginitis is rarely caused by the Klebs-Loeffler bacillus, but has been noted frequently as an extension of the process in such exanthemata as measles and scarlet fever.

There has been considerable discussion and much laboratory work on the identity of the gonococcus of infantile genital infections. Stein and his coworkers did not find any marked differences serologically between gonococci recovered by culture in their series and the various strains of adult gonococci against which the reactions were made. On the other hand Bonarscu, carrying out the reactions of agglutination, precipitation and deviation of complement, using serums from rabbits inoculated with gonococci isolated from female children and adult males against strains of gonococci of different origin, brought to light a difference of behavior of the gonococcus of the adult from that of children. It would seem proved clinically that the gonococcus recovered from the majority of cases of vulvitis in children represents a less virulent type than the gonococcus of adults. Various types of intestinal protozoa, pin- or seat-worms, or trichomonas, have been regarded as the original source of infection or inflammation of the vulva, the rubbing and scratching consequent to the mechanical irritation excited by their presence opening a fair field for the propagation and effect of the skin surface or rectal bacteria. Possibly in some of the nonspecific cases an examination of the feces may explain the long continuance of the condition under otherwise correct treatment.

As a rule the typical case of gonorrheal vulvovaginitis presents the picture of a moderate desquamative erythema of the vulva. The external genitalia and neighboring folds of skin are covered by a thin whitish mucopurulent or purulent discharge. There is at times in older girls an acne-like folliculitis of the labia. Often the inner aspect of the thigh presents a slight dermatitis. In many cases the vagina is affected coincidentally, the soft, thin vaginal epithelium being penetrated easily by the invading cocci, the reddened areas on the vaginal walls being seen easily when the coating of purulent leucorrhea has been swabbed away. Not infrequently the urinary meatus participates in the general inflammatory reaction. Lesions of the cervix, the body of the uterus and the remainder of the internal genital organs are infrequent. Bartholinitis is infrequent. Local suppuration, that is, of the vulva, is not common, but inguinal adenitis with suppuration often occurs. Both German and American observers recognize the frequency with which rectal infection coexists with gonorrheal vulvitis, but an English author, Kidd, in his recent book on gonorrheal conditions in the female does not seem to agree with this finding.

Scomazzoni had the opportunity of making histologic examinations

of the portio vaginalis and cervix of an infant who had suffered with gonorrhea of the genitals, but who had died of diphtheria. The changes in the cervix were similar to those observed in gonorrheal cervicitis of the adult, which explains at once the occasional prolonged resistance of the disease to the most assiduous attempts at treatment. He found typically chronically inflamed glands on the external surface of the portio vaginalis.

With the variety of etiologic factors present and recognized it is not surprising that the casuists have evolved several methods of classifying the inflammatory conditions of the vulva and vagina in children. Possibly the easiest method is to classify the cases as specific, when the gonococcus is recovered in culture or demonstrated in smears, and to classify all others as nonspecific. This latter group would include everything from the simple catarrhal condition of physiologic origin due, in early infancy, to desquamative processes, and later to changes in metabolism, and further the mechanical reactions with their resulting inflammatory changes originated by uncleanness or rectal infestation, and the various auto-infections, micrococcus catarrhalis, etc.

Complications are rarely seen in the internal genital organs. At times infantile gonorrhea may take an ascending course and lead to severe and lasting lesions. What effect such conditions might have upon the later functions of the pelvic organs is speculative. Many cases of otherwise unexplained acquired vaginal atresias may be laid to the adhesions produced by the inflammation of the vagina in this disease. The bladder seems to be but seldom affected. Randal found the cervix definitely infected in a number of intractable cases; some of these presented ectropion of the endocervix. The invasion of the rectum has been noted many times, especially in the epidemic form of the disease. The rectal mucosa may be infected by direct extension or by the use of a common thermometer, irrigating nozzle or other instrument, and may often be the source of the reinfection of the vulva in relapsing cases. The pathologic changes in proctitis are not marked, the rectal mucosa is reddened and covered at times with a thin seropurulent exudate in which the gonococcus may be demonstrated. Byfield and others have pointed out a rectal infection in male children as a source of origin of outbreaks in infant wards. Gonorrheal arthritis may follow vulvovaginitis in infants and children. Holt states that a pyemic arthritis in a young infant is more frequently due to the gonococcus than to any other organism. Ophthalmia and endocarditis are rare complications of vulvovaginitis.

Relapses and second attacks are extremely frequent. These may be the result of insufficient treatment or to reinfection from the original source. Thus one uncured patient in an institution may be the source of a second attack among cured patients, or a cervical or rectal gonorrhea may persist and cause succeeding attacks of vulvovaginitis. In

many cases relapses occur more than once. The criteria of cure vary so greatly that the term relapse would have to be used guardedly in some instances. Gonorrhea of the rectum takes longer to cure, but relapses of gonorrheal proctitis are said to occur comparatively rarely.

The diagnosis of gonorrheal vulvovaginitis rests essentially upon the demonstration in the stained smear preparation of the diplococcus of Neisser. Material for smears should be obtained by means of a wire loop. In the opinion of Stein, cultures are unnecessary, as in his series positive cultures were found in only 50 per cent of cases presenting positive smear preparations. In some instances it has been found advisable to stain the sediment obtained by vaginal irrigation to arrive at a positive diagnosis. Smears from the cervix may be obtained through a small (No. 26) urethroscope. The uncertain value of the complement-fixation test in gonorrheal conditions in adults has probably led to its not being used generally in juvenile gonorrhea.

As a general statement the prognosis of infantile vulvovaginitis is regarded as favorable. The duration of the disease should be relatively short, provided that the causative factor is not continuously active or that the greater irritation of too active treatment is not responsible for the continuance of the disease. The basic principle in treatment is cleanliness, ordinary soap and water cleanliness. This in itself will effect a cure in a large proportion of the simple catarrhal, mechanically produced types resulting from dirt irritations, and non-specific bacterial cases. Combined with such simple hygienic therapy may be added soothing dusting powders. In some instances tonic treatment may be added. In cases of oxyuriasis the proper helminthic must be added. In the specific cases, or in the nonspecific cases resisting treatment, local antiseptic measures are in vogue. The medicaments used are many. The various silver salts, especially the colloidal silver preparations, various dyes and other chemicals have been advocated for use locally by applications, irrigations, douches or by suppositories or bougies, and by injection in pastes or ointments. The difficulty of treating easily terrified young children makes the actual carrying out of almost any form of treatment not an easy matter.

Gellhorn and Stein recommend the use of silver nitrate and mercuriochrome, respectively, in a 1 per cent strength in an ointment base consisting of equal parts of lanolin and white vaseline. This is injected into the vagina by means of a simple glass syringe to which is attached a small rubber tube. The vagina is filled with the ointment, and the excess is allowed to spread over the vulva. The injections are made daily. Stein reports the gonorrheal patients are cured in ten weeks, the suspicious cases in six weeks, and the nonspecific cases in five weeks by this method, and the follow-up work demonstrates its efficiency, there being no recurrence in twenty cases after a year.

If the condition resists simple hygienic therapy or the locally applied

chemicals, vaccines should be tried. Indeed the benefits from the use of vaccines are so confidently recommended by many observers that it is a question whether this method should not always be adopted as a specific part of the treatment. Consequently it would be advisable to take a culture, at the time of making the early smear preparations, to obtain a growth of the organism present for an autogenous vaccine. Naturally autogenous vaccines are to be preferred, and for an initial series of injections, the administration of from 25 to 50 million of organisms are recommended to be injected at intervals of from five to seven days for five weeks. In every case in which the gonococcus is found it should be regarded as the primary infecting agent, and in case it is impossible to obtain autogenous vaccines a stock gonococcus vaccine may be used for the class reaction produced. The initial dose for a child of one year of a stock gonococcus vaccine is given as from one to three million organisms. It may be remarked that prolonged local treatment may be injurious, by the constant chemical irritation and by lessening any chance for recovery of the natural defensive resources of the vagina against bacterial invasion.

That any type of gonorrhea is cured is always a difficult conclusion. Therefore it is not surprising that various observers differ greatly in their ideas on this point. The method elaborated upon by Stein seems to be quite practical; that all clinical evidence of the disease must have disappeared; that negative smears be obtained weekly for three weeks, and that no clinical evidence be noticed during a period of observation equal in length to that used in treatment. In stubbornly resistant cases the disappearance of the gonococcus may be determined by using the method of Van Gieson. The method depends upon the irritation produced by a solution of silver nitrate and the examination of the sediment obtained by irrigation twenty-four hours after the silver has been applied.

In conclusion, one might remark upon the questions of hospital practice regarding isolation, observation of new cases, the question of handling outbreaks, as to laundry, etc., but the time allotted is too short to dwell upon these all important points.

(For discussion see page 529.)

DUODENAL ULCER FROM PARTIAL OBSTRUCTION AT THE DUODENOJEJUNAL JUNCTION*

BY EDWIN P. SLOAN, M.D., BLOOMINGTON, ILLINOIS

IN A paper presented to this organization at its thirty-fifth annual meeting in 1922, fifty-four cases of duodenal ulcer from partial obstruction at the duodenojejunal junction that had been relieved by surgical removal of the obstruction were reported in detail. From July, 1922, to July, 1925, surgical intervention at the duodenojejunal junction alone has been done sixty-four times for duodenal ulcer; associated with appendectomy twenty-four times, with appendectomy and cholecystectomy nineteen times, and associated with gastroenterostomy five times. Visible ulcer of the duodenum was demonstrated at the time of operation by transillumination in eighty-four of the one hundred and twelve cases.

Conditions found at operation and thought to be responsible for the partial obstruction and the development of duodenal ulcer were as follows: Definite jejunosocolic bands, 28; veils or light adhesions definitely kinking the jejunum near its origin, 12; irregularities of the opening through the mesocolon, 8; ptosis of duodenum, acute angle at terminal portion, 14; and tuberculous tumor in mesocolon narrowing the opening and making direct pressure upon the terminal portion of the duodenum, 1. More than one of the above conditions were present in 39 cases.

Associated conditions requiring gastroenterostomy included four cases of ulceration extending through the pylorus with definite constriction at the pylorus and one cicatricial constriction of the pylorus and suspected ulcer of the cardia.

The operative procedures employed were as follows: Separations of the jejunosocolic bands, 34 cases; separations of veils or light adhesions, 29; severing part or all of ligament of Treitz, 32; partial resections of one leaf of mesocolon, 4; miscellaneous procedures for mobilization of gut at junction, 46; duodenojejunosomies, 3; plications of lower layer of mesocolon and mobilization of terminal portion of duodenum, 3, and gastroenterostomies, 5 cases.

Thirty-eight of these patients were operated upon more than two years ago and forty-four more than one year ago. Thirty were operated upon during the last fourteen months. While not enough time has elapsed to state that the results are permanent, yet the symptoms have

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, and 18, 1925.

returned in only one case, and that patient had gastroenterostomy as well as intervention at the duodenojejunal junction.

Of the fifty-four cases that were included in our previous report, two died from other causes, one had a cholecystectomy performed, and two required reoperation. In the two cases that were reoperated upon, the symptoms were those of pyloric obstruction. But visualization of the duodenum by fluoroscopy after filling it through the Rehfuß tube, demonstrated that the pylorus was not obstructed but that the obstruction had recurred at the duodenojejunal junction with marked dilatation of the duodenum. In both of these cases duodenojejunostomy gave relief.

Visualization of the duodenum by injection of air or warm bismuth solution through the Rehfuß tube is the usual means of arriving at a diagnosis of partial obstruction at the duodenojejunal junction. Another method is to watch the last portion of the test meal when it leaves the stomach until it passes into the jejunum. As long as portions of the stomach contents are being thrown into the duodenum the contents are forced along and there is no appreciable slowing up of the current even though partial obstruction near the terminus is present. But when the duodenal content is small in amount there is not enough bulk to force it through the obstructed portion, and reverse peristalsis occurs. The last portion of the test meal has frequently been observed to make the excursion from the pylorus to the distal end of the duodenum and back. This usually occurs about every twenty minutes and pain is present during the time that reverse peristalsis is active.

CONCLUSIONS

Partial obstructions at the duodenojejunal junction are sometimes the direct cause of duodenal ulcer; they are sometimes the indirect cause, creating conditions favorable for its development. In some appropriate cases removal of these partial obstructions without gastroenterostomy will be sufficient for the cure of the ulcer.

(For discussion see page 523.)

ON A POSSIBLE CAUSE FOR PEMPHIGUS NEONATORUM. A PRELIMINARY REPORT

BY ROY E. KRIGBAUM, M.D., COLUMBUS, OHIO

(Instructor in Obstetrics, Ohio State University, Columbus, Ohio)

IT WAS the writer's good fortune in 1920 to be a house physician at the Chicago Lying-In Hospital, at the time Dr. Fred Falls was conducting his bacteriologic investigations of the cause of so-called "Pemphigus Neonatorum." His conclusions were that the infecting organism was a staphylococcus of low virulency. Some authorities have classified pemphigus neonatorum as one form of the common impetigo contagiosa, although these two conditions differ both in the clinical manifestations and virulence of the organism found in them by cultural methods. During recent epidemics in three of our local hospitals, we were able to confirm Dr. Falls' conclusions from investigations conducted by the Bacteriological Department of Ohio State University. At this time, it was impossible to transmit this infection to the investigator's skin, to produce a lesion by taking material from one lesion and rubbing it into the skin at another site in the same baby, or to inoculate an uninfected baby by direct contact. The hospitals in combating this infection were using all of the standard methods in technic to prevent transmission of infections of all kinds and they were only partially successful. From this work we felt that the organism found in these lesions was probably no more virulent than the organisms which were present in most hospitals, and which probably do not cause any lesion in normal individuals. About this time we were receiving reports that physicians who were conducting cases in patients' homes were also reporting cases of pemphigus. We wondered if the primary etiologic factor in this disease might not be some preliminary irritation of the babies' skin which made it susceptible to this otherwise innocent organism. We, therefore, felt that we should make an effort to discover some agent which was used by both hospitals and men who were reporting cases of this infection on babies delivered in the home.

Going over the possible sources of irritation, the antiseptic solutions came under our scrutiny and we found that all of the institutions were using the commercial liquor cresolis compositus and not the proprietary preparation. There came also to our attention at this time these facts: First, that when these epidemics started in hospitals, the first few cases seemed to have mild lesions which responded readily to treatment, but after the epidemic had continued for some time, the organisms seemed to have become more virulent. Second, that early in the epidemic the

preliminary lesions were located under the mandible, around the umbilicus, in the arm pits, and in the inguinal region where an obstetrician most frequently touches with his hands a baby being delivered, his hands just previously having been dipped in lysol solution. Third, we discovered that one epidemic started a very short time after the hospital had received a new barrel of liquor cresolis compositus. Fourth, about six months ago, when this thought came to mind, one of the three hospitals discontinued the use of liquor cresolis compositus and adopted a proprietary preparation and since that time they have had no cases of skin lesions in any form.

With the foregoing observations in mind, we went to the delivery rooms of five of our local hospitals and secured samples of the antiseptics which they were using. We also secured a sample from the Department of Chemistry of Ohio State University. These six specimens were submitted to the Department of Physiological Chemistry of the Medical College of Ohio State University, and investigated, and the following is a report of these investigations for which we are indebted to J. B. Brown of that Department:

The preparation, liquor cresolis compositus, is essentially a solution of cresol in potassium soaps of the unsaturated fatty acids, the soap being prepared by direct saponification of some oil, such as linseed, with potassium hydroxide, the cresol being added after the saponification is complete. "Lysol" is merely the proprietary name for such a preparation. From the chemical standpoint three causes for the pathologic condition described above have occurred to us.

1. Variations in the cresol, with the presence of irritant impurities, such as phenols or other substances.
2. Variations in the oils used in the preparation of the soaps.
3. Differences in the amount of free alkali in the soaps due to carelessness in preparation or other causes.

Variations in the cresol might be a very plausible cause for the trouble were it merely irritation of the skin, but, if this were so, one would not expect to find infection following the irritation. If enough phenol were left on the skin to cause a blister, it is difficult to see how microorganisms could enter, particularly of the type found there.

It is likewise difficult to see how variations in the soaps, or, more particularly, in the fatty acids in the soaps, would make any appreciable difference, certainly not enough to cause the trouble described.

The principal possibility for difference in actions in the preparations seemed to lie in variations in the free alkali in the soaps. Experimentally, we have had as yet no opportunity to try out the other two possibilities. With respect to the third, however, we have determined the free alkali and the hydrogen-ion concentration of several preparations. One of these was a sample of lysol which came from the hospital which had been free of any lesions since its adoption, as mentioned before. The other five were samples of liquor cresolis compositus, of which the latter four were suspected to have produced the trouble described.

The sources of the six specimens were as follows:

1. Maternity Hospital, Ohio State University, using "lysol" for past six months with no skin lesions since its adoption.
2. Liquor cresolis compositus from the Department of Chemistry, Ohio State University, the product furnished the medical students by the University.

3, 4, 5, 6. From hospitals where epidemics have occurred at intervals during the last few years.

The hydrogen-ion concentration of the lysol and sample No. 2 was 7.5 to 8.0, the high color making more accurate determination impossible by the colorimetric method. That of samples Nos. 3, 4, and 5 was 9.0 to 9.5 or even slightly above that. The results were the same when the indicator was added drop to drop of the sample or whether the sample was highly diluted with water with subsequent possibilities for hydrolysis. The free alkali in the toxic samples, Nos. 3, 4, and 5, was determined as follows: 5 c.c. of the preparation was added to 150 c.c. of water; phenolphthalein was added, and the mixture was titrated with tenth normal sulphuric acid to disappearance of the pink color. Sample No. 3 required 4 c.c.; sample No. 4, 6.5 c.c.; sample No. 5, 3.8 c.c., to bring about this change. As determined in this manner, therefore, the sample No. 3 had a free alkalinity amounting to 0.08 N.; sample No. 4, 0.13 N.; and sample No. 5, 0.07 N. Lysol and sample No. 2 were neutral or possessed no free alkalinity with this procedure. Sample No. 6 turned white when added to water so was not used, as it evidently contained some other agent.

These results are not proof that this free alkalinity is the cause of trouble, but the fact that the lysol with a zero alkalinity has no toxicity and the three preparations with high alkalinity have toxicity suggests to us a possible correlation between the two. The results also show considerable variation in the free alkalinity of different preparations of the liquor.

Sample No. 2 in the above experiment compared favorably with the proprietary preparation, which proves that liquor cresolis compositus can be made without large quantities of free alkali being retained in the solution. The writer believes that preparations with as much free alkali as reported in specimens Nos. 3, 4, and 5, should produce the same amount of irritation as ordinary washing powders, composed largely of sodium carbonate, or laundry soap would produce if we used these products in the nursery to bathe the babies. We feel, also, that there is a strong possibility that the irritating alkaline solution is at times the cause of pemphigus.

SUMMARY

From the foregoing observations we can say positively that: first, no liquor cresolis compositus which has not been titrated to determine its free alkalinity should be used in delivery rooms or nurseries in such a way that it might come in contact with babies' skins, no more than we would wash diapers in strong alkali; second, that one cannot eradicate an epidemic of pemphigus by changing the solutions in the delivery room or nursery without resorting to the usual methods of isolation and prevention, because, when an epidemic is once started, the mild staphylococcus increases in virulence as a result of its rapid transmission from one host to another, to such an extent that it becomes capable of infecting a normal nonirritated baby; third, as a precaution against the common form of impetigo, young children should be prohibited from visiting newborn babies during their confinement to the hospital.

A METHOD OF OBTAINING VAGINAL SECRETION FOR BACTERIOLOGIC EXAMINATION WITHOUT THE POSSIBILITY OF VULVAL CONTAMINATION*

By JOHN W. HARRIS, M.D., AND J. HOWARD BROWN, PH.D.
BALTIMORE, Md.

(From the Departments of Obstetrics and Pathology and Bacteriology, The Johns Hopkins Hospital and University)

WISHING to investigate certain phases of the bacterial flora of the vagina, we were early impressed with the difficulty of obtaining secretion which could be regarded with certainty as the uncontaminated contents of the vagina. Because of the anatomy of the genitalia, exposure of the vaginal vault without the probability of contamination from the labia has presented difficulties which we do not believe have been overcome up to this time. In most of the reported bacteriologic investigations the vaginal cultures were obtained in one of two ways: by the exposure of the vaginal vault with a sterile speculum; or by the use of the Menge tube. Both of these methods have been described repeatedly so that repetition of them seems unnecessary.

Williams¹ has pointed out the difficulties encountered in obtaining uncontaminated secretion from the vagina by means of the speculum. In this method contamination of the vaginal secretion by bacteria from the labia as the speculum is introduced is highly probable. This probability becomes almost a certainty in the case of nulliparae in whom the introitus is so tight that its margins can be separated only to a limited degree. To overcome the possibility of such contamination, many investigators have attempted to sterilize the vulva by means of chemical antiseptics. Two objections may be offered to this. It is more than doubtful if we possess an antiseptic that can be applied to the delicate structures of the external genitalia in sufficient strength to insure complete sterilization. Granting, however, that such sterilization is possible, there is always the danger that some of the antiseptic may be carried up into the vagina by the speculum and thus, partly at least, affect the growth of the bacteria in the vaginal secretion. To test the force of the latter objection the labia of a number of women were thoroughly painted with a 2 per cent aqueous solution of mercurochrome. A small speculum was then introduced, care being taken to part the labia as widely as possible, and in every instance the tip of the speculum was found to be stained with the antiseptic.

The Menge tube would seem to have at least one advantage over the speculum in that it is only 5 mm. in diameter and thus does not afford

*Received for publication, January 11, 1926.

so wide an area for contamination as the speculum. It would appear, however, that there is no way to protect the edges of the fenestrum in its outer tube from contamination by bacteria in the lowermost part of the vagina or on the labia. Obviously, if the edges of the fenestrum become contaminated the contents of the inner tube will not truly represent the bacterial flora of the upper vagina. That the Menge tube possesses little if any practical advantage over the speculum has been shown by Fricke,² who, after a study of the vaginal secretion of 50 pregnant women, came to the conclusion that streptococci were found with equal frequency when the secretion was obtained by the speculum or Menge tube.

DESCRIPTION OF METHOD

To obviate the dangers of contamination inherent in both the speculum and Menge tube, we have developed a device which enables us to obtain a sufficient quantity of vaginal secretion for bacteriologic study, and which we think can be regarded as representing the true secretion, uncontaminated by organisms from the

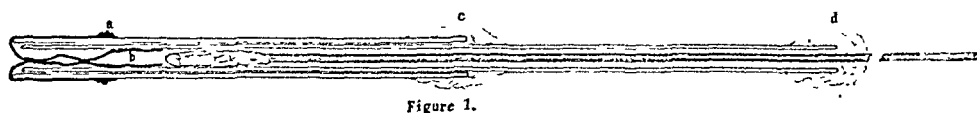


Figure 1.



Figure 2.

Fig. 1.—Device assembled and ready for use.

Fig. 2.—Device in the vagina after swab has been pushed out.

labia. This consists of a tube of ordinary 8 mm. laboratory soft glass, 120 mm. in length. Fitting snugly, but permitting free motion within it, is a second glass tube, made of the same material and measuring 220 mm. in length. A rubber cylinder made of ordinary thin rubber glove stock, measuring about 120 mm. in length and 7 mm. in diameter, and open at both ends, is drawn over the lowermost 30 mm. at one end of the outer tube, in such a way that about 45 mm. of it projects beyond the end of the glass tube, while the rest of it is rolled on itself so as to form a cuff, which secures a tighter fit, as shown at (a), Figs. 1 and 2. The inner glass tube is then pushed through the free end of the outer tube and, when its extremity reaches the lower end of the latter, the projecting end of the rubber cylinder is invaginated into the inner glass tube, the rubber being thrown into folds, as shown at (b), Fig. 1. To prevent slipping, the junction of the outer and inner tubes is wrapped with a wisp of cotton, as shown at (c) in the figures. An ordinary wooden applicator, 300 x 2 mm., covered with a cotton swab at one end, is inserted through the free end of the inner tube until it comes to rest upon the infolded end of the rubber cylinder and is fixed at that point by wrapping the junction of the applicator and the inner glass tube with a wisp of cotton, as shown at (d) in the figures. Fig. 1 shows the device completely assembled. It is placed in a large test tube, wrapped in a double cover and sterilized in the autoclave. These tubes may be prepared in quantity and used as desired.

When taking a culture, without preliminary disinfection, the labia are parted as widely as possible. The rubber-covered end of the outer tube is gently placed

within the introitus, care being taken that it is not pushed up into the vagina. Then, while holding the outer tube in place with the left hand, pressure is exerted upon the inner tube with the right. As the latter is pushed down, the infolded rubber cylinder gradually emerges and unfolds until finally the free end of the inner tube slips through the rubber covering and comes to lie high up in the vaginal vault. It should be particularly noted that the rubber cylinder is not pushed up in the vagina, but simply unfolds from the end of the tube, so that the end of the inner glass tube is not exposed until it emerges from the end of the rubber cylinder. The applicator stick is then pushed down until the cotton swab comes into contact with the vaginal wall. A few turns of the stick enable the swab to collect enough of the vaginal secretion for bacteriologic study. The stick and swab are then withdrawn while the tube is still in place and are placed in a sterile test tube or the appropriate media are directly inoculated. Fig. 2 shows the tube as it lies within the vagina with the cotton swab projecting beyond the end of the inner tube.

In using this device the only difficulty we have encountered is that the rubber cylinder may stick as it emerges from the inner tube. This, however, can be obviated by dusting the cylinder with talc as the device is being assembled. The glass tubes, as well as the rubber cylinders, may be used repeatedly. At first we determined the point of emergence of the inner tube through the rubber cylinder by a mark on the inner tube, but, with a little practice, this was found unnecessary, as it is evidenced by a slipping sensation transmitted to the fingers.

In our hands the above described apparatus has proved very satisfactory. After it has been assembled and sterilized a vaginal culture can be taken within one or two minutes and requires no preparation on the part of the patient or operator.

Since the point of prime importance is to make sure that no bacteria are carried up into the vaginal vault from the labia, we subjected our apparatus to the following test. The external genitalia of ten women were generously swabbed with a twenty-four-hour bouillon culture of *Bacillus prodigiosus*, which can do no harm, as it is a non-pathogenic organism which is characterized by the formation of red pigment. Then, without attempting to sterilize the labia, vaginal cultures were taken by means of the device described above, and the material was immediately planted on potato slants. After forty-eight hours of incubation no red colonies of the *Bacillus prodigiosus* were found on any of the ten slants, thereby conclusively demonstrating that no bacteria had been carried up into the vagina from the labia.

REFERENCES

- ¹Williams: Am. Jour. Obst., 1898, xxxviii, No. 6.
- ²Fricke: Quoted in Williams, Obstetrics, Ed. 5, 1924, p. 997.

SPONTANEOUS RUPTURE OF THE UTERUS IN LABOR FOLLOWING STURMDORF TRACHELOPLASTY

BY NICHOLSON J. EASTMAN, A.B., M.D., PEKING, CHINA

(Associate in Obstetrics and Gynecology, Peking Union Medical College)

POSTOPERATIVE cicatricial atresia of the cervix has long been recognized as a cause of dystocia. As early as 1883 Murphy¹ reviewed eleven instances of this occurrence. Audebert² in 1898, Guibot³ in 1900, and LePage⁴ in 1903 reported difficult labors following trachelectomy, LePage's case necessitating Porro-cesarean section. In 1913 Leonard⁵ tabulated the immediate and late results of one hundred and twenty-eight patients upon whom high amputation of the cervix had been done, and found that "fifty per cent of the pregnancies occurring after cervix amputation terminated prematurely, while among the few who progressed to full term, even a larger proportion experienced difficulty and prolonged labor." A subsequent analysis by the same writer⁶ of thirty-nine cases of trachelorrhaphy indicated that following this operation labor was almost always normal. Rawls⁷ on the other hand, in an exhaustive study of the end-results of two hundred and eleven cervical operations at the Woman's Hospital, New York, showed that in this series at least trachelorrhaphy rather than amputation predisposed to dystocia. Of his thirty-two trachelorrhaphy cases later becoming pregnant, three required cesarean section on account of cervical rigidity.

While the older operative procedures on the cervix have thus been carefully investigated concerning their effect on subsequent labor, similar quantitative studies on the now widely used Sturmdorf tracheloplasty are apparently lacking. Polak,⁸ in a review of the end-results of three hundred and fifty cervical operations, reports that both trachelectomy and tracheloplasty (Sturmdorf) may result in dystocia, the latter less frequently than the former. He cites two cases of cesarean section done in his clinic for cervical dystocia of this kind, but does not mention whether the antecedent operation had been amputation or tracheloplasty. In a later communication⁹ he sounds an emphatic warning against the too widespread use of cervical surgery on women in the child-bearing age. Magid¹⁰ and Coventry,¹¹ however, feel that the Sturmdorf tracheloplasty has no influence on labor, the former reporting nine and the latter two cases of successful delivery after the operation.

The following instance of rupture of the uterus subsequent to Sturmdorf tracheloplasty is, as far as the writer could determine, the first of its kind to be recorded.

Hosp. No. 9699.—A Korean woman, age thirty-two, entered the Out-Patient Department of the Peking Union Medical College December 17, 1924, complaining of profuse, intractable leucorrhea of ten months' duration. She had had four full term spontaneous deliveries, the last just prior to the onset of the present complaint. The patient, being a Korean, did not speak the language of North China, and consequently linguistic difficulties rendered the history rather scanty and unreliable. The date of her last menstrual period was uncertain, probably near November 21. No important abnormalities, except a massively hypertrophied, nodular cervix with deep stellate lacerations were found. There was extensive cyst formation on the upper lip and eversion of the lower lip, which bled easily. She was advised to enter the hospital for operation. This she did on December 20.

Operation.—Following a week's preparatory treatment, operation was done on December 27. Ether anesthesia (open), cervix dilated to 10 mm., using Hegar dilators. Circular incision and dissection of cuff of mucous membrane was carried out just exterior to infected area. The cervical canal and surrounding tissues were coned out, and four sutures of chromic catgut, No. 2, twenty day, were taken after the manner of Sturmdorf. Hegar dilator No. 5 passed easily through the cervix. Uneventful convalescence. Examination, January 12, 1925, showed cervix completely covered with pale pink, glistening epithelium. Discharge slight. Cervical canal open to probe. Result recorded as "good." Discharged with advice to return in a month for examination.

Examination of cervical tissue showed chronic endocervicitis.

Second Admission.—Patient did not return for examination as directed and failed to answer follow-up inquiries, but entered hospital again August 28, 1925 at 10:30 A.M., in active labor. Pains had started at 4 A.M. The membranes had not ruptured. Pelvic measurements normal. Position L. O. A., fetal heart left lower quadrant, rate 130, good quality. Head engaged and low in pelvis at level of ischial spines. Cervix 3 cm. dilated (rectal).

2 P.M. Labor pains severe in character, occur every 3 to 4 minutes, lasting 30 seconds. Slight vaginal bleeding with each pain. Patient anxious and restless. Suffers inordinately from pains. Cervix 4 to 5 cm. dilated, oval in shape; cervix and lower uterine segment thinned out (rectal). Diagnosis of threatened uterine rupture made. Husband sent for in order to obtain permission for immediate cesarean section.

2:40 P.M. Pains suddenly ceased. Clinical picture entirely changed. Patient now apathetic and oblivious to surroundings. Head lolls from side to side. Her eyelids are closed, her eyeballs rolled up so that only the sclerae are visible. She refuses to lie on her back and insists on sitting up, but needs support for this. Pulse weak and becoming more rapid, finger tips cold and blue. Blood pressure 90/50. Patient complains bitterly if pressure is made anywhere on abdomen. Vaginal bleeding increased in amount. Fetal heart not heard. Vaginal examination: Head now high in pelvis. Cervix (or laceration) now 6 to 8 cm. dilated. A diagnosis of rupture of the uterus was made and the patient prepared for celiotomy.

Operation.—Infant weighing 3,050 grams found with head and right arm extruded into peritoneal cavity. Left uterine wall site of laceration 12 cm. long extending upward from vagina, through cervix, and into lower uterine segment. Supravaginal hysterectomy. Uneventful, afebrile convalescence.

The case presents several notable features:

1. Rupture occurred after less than eleven hours of labor.
2. The patient was from two to three weeks' pregnant when the tracheloplasty was done. Under the circumstances mentioned, this coincidence was unavoidable. It is striking, however, that the operative

trauma, including a dilatation to No. 10 Hegar dilator, did not precipitate abortion. It would also have been thought that the physiologic softening which the pregnant cervix undergoes would have hindered postoperative fibrosis sufficiently to prevent the intense cicatricial rigidity present in labor.

3. Convalescence following the hysterectomy was surprisingly smooth, attesting the favorable prognosis of those cases which have had no contaminative vaginal manipulation, and have had immediate diagnosis and early operation.

4. The cervix was patent to a No. 5 Hegar dilator at the close of the operation and to a probe fifteen days later. Any gross blunder such as actually "sewing up" the cervix can therefore be dismissed. (Cases are known in which this has occurred, hematometra resulting.)

It is impossible to draw conclusions from one isolated case. Sturmdorf tracheloplasty has in general given excellent results in this clinic; we find it the only adequate means of treating many advanced cases of endocervicitis, and we would not want to condemn its use even in women of the child-bearing age simply on the score of this one unfortunate experience. We would like, however, to record the case in order that it may have due consideration in any ultimate summary that may be made of the late results of the operation.

REFERENCES

- ¹Murphy, P. J.: *Am. Jour. of Obst.*, 1883, xvi, 28.
- ²Audebert, J. L.: *Ann. de gynec. et d'obst.*, 1898, xlix, 20.
- ³Guibot: *Thesis*, Paris, 1900, No. 341. Cited by Leonard.⁵
- ⁴LePage: *Bull. Med. Par.*, 1903, p. 947.
- ⁵Leonard, V. N.: *Surg., Gynec. and Obst.*, 1913, xvi, 390.
- ⁶Leonard, V. N.: *Surg., Gynec. and Obst.*, 1914, xviii, 35.
- ⁷Rawls, R. M.: *AM. JOUR. OBST. AND GYNEC.*, 1922, iii, 1.
- ⁸Polak, J. O.: *AM. JOUR. OBST. AND GYNEC.*, 1923, v, 640.
- ⁹Polak, J. O.: *Appendix, Gynecological and Obstetrical Monographs*, 1925, p. 3.
- ¹⁰Magid, M. O.: *New York Med. Jour.*, 1921, cxiv, 387.
- ¹¹Coventry, W. A.: *AM. JOUR. OBST. AND GYNEC.*, 1925, ix, 804.

INTRAPERITONEAL HEMORRHAGE COMPLICATING ABORTION

BY WENDELL L. DOWNING, M.D., LE MARS, IOWA

(From the Le Mars Clinic)

INTRAPERITONEAL hemorrhage complicating spontaneous abortion is a condition rarely met with in gynecologic practice. Few textbooks even mention it as a possible complication of abortion. It undoubtedly occurs often but in so slight a degree as not to be recognized. Possibly much of the pelvic pain and tenderness in abortion is due to the irritation from a slight hemorrhage into the peritoneal cavity. Only in cases where the hemorrhage is of sufficient quantity to produce severe symptoms, necessitating operation, is such a condition recognized. If uterine blood and mucosa so frequently reach the peritoneal cavity through the tubes during menstruation, as Sampson has shown, may they not also do so in abortion?

During menstruation the tubal mucosa becomes congested and a slight effusion of blood into the lumen may take place. This is probably infrequent, however, and is of little practical importance as a source of menstrual blood. Evidences of tubal effusion are, that tubes fastened in the abdominal wall often show a periodic bloody discharge and, that a decidua menstrualis has been found in the tube.

During pregnancy the tubes are stretched out, varying in length from five to nineteen cm. and they hang perpendicularly at the sides of the uterus. The tube wall becomes thickened, but no muscular hypertrophy normally occurs. The mucous membrane becomes thickened and congested and a moderate decidual change has been observed in the tube in normal intrauterine pregnancy. The uterine end of the tube is closed normally by the decidua during pregnancy but the fimbriated end is open.

Occasionally at operation blood may be found escaping from the fimbriated end of the tube during menstruation. This may readily happen as both ends of the tube are patent during the menstrual phase. Sampson has recently shown that uterine stroma and blood frequently reach the peritoneal cavity during menstruation, with consequent transplantation of the uterine stroma in the ovary, intestine and other organs.

During pregnancy the uterine end of the tube is closed by the intrauterine decidua. Thus intraperitoneal bleeding from the uterus during pregnancy presupposes a patent interstitial portion of the tube. Several conditions causing backflow of uterine blood during pregnancy or during an abortion are believed to exist.

1. The uterine end of the tube becomes patent, due to dilatation of the muscularis, much as the change taking place in the cervix, the uterine decidua vera separating from the wall of the fundus and cornu.

2. Uterine blood is dammed back by an undilated and closed cervix or by blood clots or tissue blocking the uterine canal, the back pressure being sufficient to cause bleeding through one or both tubes into the peritoneal cavity.

3. Uterine tumors, as myomata, or uterine malposition may occlude the cervical canal with resultant back pressure. Two small myomata were present in the posterior uterine wall of the case reported but their size and location make it improbable that they were a factor in the intraperitoneal bleeding.

The following case, apparently one of intraperitoneal hemorrhage complicating abortion, came under our observation.

CASE REPORT

Patient, white, age thirty-two, married, was first seen Feb. 22, 1922. December, 19, 1921, was the first day of the last menstrual period. For six weeks she had some morning nausea and felt as she did in her two previous pregnancies. On Feb. 20 she felt well all day, but on going to bed she noticed a slight bloody vaginal discharge, with no pain. Feb. 21 the flow continued, was of moderate severity and a few small clots were passed. That afternoon she began to have a dull and aching pain in her left lower quadrant and in her pelvis. Feb. 23 the pain was more severe and her side was very tender, but the vaginal bleeding was less. That afternoon she had five or six severe sharp bearing-down pains in her pelvis and left side. She did not feel faint; there was no nausea, vomiting or chills. That night at nine o'clock she was brought to the hospital. Her pain was severe and knife-like and was localized in her left lower quadrant.

The patient had had no previous illnesses. Her menses began at thirteen years of age, were regular twenty-eight-day type and lasted four or five days. She had two children, five and three years of age. Her labors were normal. She had had no miscarriages.

The patient's general condition was good. She walked in a stooped position. Her color was good. Her temperature was 99.4°, pulse 85 and respirations 24. The breasts showed evidences of early pregnancy. The abdominal wall was thick, but there was no distention. There was marked tenderness and slight rigidity in the left lower quadrant. No mass was palpable. Bimanual examination showed a scant bloody discharge with no odor. The cervix was soft, the os barely admitting one finger. The uterus was enlarged to the size of a two months' pregnancy; it was soft and movable but seemed displaced to the right. The right tube and ovary were normal. To the left of the uterus and in the culdesac there was marked tenderness and a definite boggy feel, but no mass was palpable. A catheterized specimen of urine was normal, her hemoglobin was 80 per cent and leucocytes 18,900.

The clinical picture was clearly that of abortion, though not all of her symptoms or findings could be explained on that basis. The slow onset with hemorrhage and later bearing-down pain was typical of abortion. The sharp pain in her left side, the tenderness, the displacement of the uterus to the right and the marked doughy feel to the left and posterior to the uterus were obviously due to some other condition. The findings, along with a 19,000 leucocytosis, indicated a localized peri-

tonitis, with probably a collection of blood to the left of the uterus. The diagnosis of ectopic pregnancy could not be ruled out. The pain, tenderness and localized findings could be explained by an ectopic with a slight hemorrhage.

Operative Notes.—Ether anesthesia. The parietal peritoneum was dark, there were no adhesions. Approximately 300 c.c. of dark, grayish red blood, with no clots, were present in the culdesac. The uterus was symmetrically enlarged to the size of a two months' pregnancy. Two subserous myomata, each 2 cm. in diameter were present in the posterior uterine wall.

The left tube was enlarged in its middle third for a distance of four cm., its serosa was normal, no mass was palpable in the tube. By pressure on the uterine fundus or by repeated milking of the tube from the uterus to the fimbriated end, fluid blood could be obtained through the fimbriated end, two or three c.c. being obtainable at each milking. The right ovary contained a corpora vera. There was no broad ligament mass, the tube was not twisted and there was no engorgement of the veins of the broad ligament. The right tube was normal.

The left tube was removed and the culdesac mopped dry. The appendix contained fecaliths and was removed. The abdominal wall was closed without drainage.

The specimen removed consisted of an amputated fallopian tube, 8 cm. in length. The middle third was swollen and felt cystic. It had a diameter of 18 mm., its serosa was normal, no mass was palpable. On section, the mucosa of the middle third was swollen and red. There was no ulceration or bleeding point. The mucosa was smooth and velvety.

Paraffin sections made by E. T. Bell of the University of Minnesota showed many clumps of polymorphonuclear and mononuclear cells in the mucosa, particularly in the middle third, but also near the fimbriated end. There was no evidence of a decidua or of a tubal pregnancy. It was diagnosed as acute suppurative salpingitis.

Postoperative Notes.—The patient's convalescence was normal. The night of the operation she expelled several large clots, thirty-six hours later she expelled fetal elements. She passed a few small clots for the following three days. Her pain was moderate, her maximum fever was 100°, and she had no distention or evidence of peritonitis. Her wound healed by first intention and she was discharged from the hospital on the sixteenth day.

COMMENT

In this case an intrauterine implantation unquestionably was present, the pregnancy having reached approximately the eighth week. A spontaneous abortion then took place, complicated by a localized acute inflammation in the left tube. Hemorrhage into the peritoneal cavity also occurred.

The blood had its origin from one of two sources. It may have come from the uterus itself or a tubal hemorrhage may have occurred, caused by the acute salpingitis. Hemorrhage does occasionally occur in acute salpingitis. In this case a considerable quantity of blood could be obtained repeatedly at the fimbriated end of the tube by compressing the uterus or by milking the tube.

The tube, when examined immediately after the operation, showed an intact, slightly reddened mucosa, but no evidence of an oozing surface or a bleeding point could be seen. It seems hardly possible that such a quantity of blood could be obtained from the tube merely by making

pressure on the tube or uterus without some source of hemorrhage being visible.

It seems more probable that the blood came from the uterus through a tube with a patent interstitial portion, the uterine decidua being separated or torn. The local inflammation in the tube may have been secondary to the uterine bleeding. The dilatation of the cervix was slight and the cervical canal was narrow. This and the presence of a blood clot could have produced sufficient back pressure to force the blood out through the tube into the peritoneal cavity.

The literature available contains no case reports of intraperitoneal bleeding from the uterus complicating abortion. Sampson states he believes such a backflow from the uterus is possible. Modern texts on obstetrics and gynecology do not mention such a condition as occurring. Sampson has shown that there is a great difference in the diameter of the tubes in women, especially the interstitial portion. He thinks escape of menstrual blood would be very frequent if the interstitial portion were large in all women. DeLee in his text states that in curettage for incomplete abortion the curette may slip into the tube.

Possibly the woman in the case reported, had tubes with a large interstitial portion. A break or separation in the decidua vera and back pressure from any of the causes mentioned would have made possible hemorrhage into the peritoneal cavity by way of the tube. This complication of abortion may possibly occur quite often but be of so slight a degree as not to be recognized.

SUPERNUMERARY BREAST NEAR LABIUM

BY J. WARREN BELL, M.D., PH.D., MINNEAPOLIS, MINN.

(From the Department of Obstetrics, St. Mary's Hospital)

THE patient was twenty-three years old when she noticed this tumor and pregnant for the third time. She fell on some sharp object and was injured in the region of the vulva. She thought that a boil developed because some thin yellow-white fluid appeared at the site of the injury. After that, with each pregnancy the mass enlarged somewhat, never receding between pregnancies. There were nine succeeding pregnancies, the patient having miscarried twice, one miscarriage being a twin pregnancy. Her normally situated breasts were small when at rest but swelled up and remained hard for a week when lactation began.

I first saw her in August, 1922, at the University Out-Patient Department, University of Minnesota. She was then fifty-nine years old. The mass was about the size of an egg, attached just in front of the left labium majus by a pedicle 3 cm. in diameter. The mass was of variable consistency, quite elastic and not attached to the skin, which slid over it easily.

Pelvic examination revealed a senile uterus. The adnexa were seemingly normal.

On September 8, 1922, because of inconvenience which the tumor caused the patient, I infiltrated the pedicle with 1 per cent novocaine and removed the tumor. The wound healed by primary union. The pathologic examination was made by Dr. E. T. Bell, who changed the diagnosis from lipoma to accessory breast.

The specimen measured 7 by 5 cm. and was covered by wrinkled skin except for the cut surface of the pedicle. The tumor was slightly elastic, smooth and symmetrical. No evidence of a nipple could be found. On section the tissue appeared shiny and pink with a few small cystic areas.

The inner portion of the tumor appeared to be made up of loose connective tissue containing a number of large plasma cells and areas of tubes and acini lined with epithelium, which as a rule is cuboidal. Where the acini were dilated the epithelium was proportionately thinned out, and in the larger cysts was of a very flat type. The whole appearance is that of a resting breast with cystic disease present.

In November, 1925, she reappeared with the story that she had a cancer in the pelvis. Examination revealed a change in the pelvic condition, involving induration of the broad ligaments, a nodule in the



Fig. 1.—Microscopic section of outer portion of tumor showing skin and areolar tissue.
The skin is loosely attached.



Fig. 2.—Microscopic section of inner portion of the tumor shows breast tissue with
cystic disease present.

rectovaginal septum and infiltration of the vesicovaginal septum, with bleeding on manipulation. The scar of the old tumor site showed no sign of recurrence. A very evident inoperable carcinoma of recent rapid growth had developed since the time of the operation, September 8, 1922.

A later report from the University Hospital where the patient was sent for palliative treatment states that there was an ulcerated crater present and that the tissue was squamous carcinoma.

The subject of polymastia is completely covered by Deaver and McFarland, who bring out the fact that a single supernumerary breast has been reported more than forty times in males and about twice as frequently in females, accessory breasts in the female being chiefly below the normal site, occasionally being found in the region of the labia. My case, I believe, is the third single accessory breast reported in this location. According to Deaver, two other cases appear in the literature with breasts located in the labial region.

Referring to comparative anatomy of the primates, *Taricus spectrum*, in addition to the pectoral glands, has an inguinal pair.

In the aye-aye, *Chiromys madagascariensis*, there is but one pair of nipples situated about an inch and a half in advance of the vulva and about an inch apart.

The lower animals not uncommonly have inguinal breasts, some having breasts on the outer side of each thigh. All cetacea have the mammary glands upon the vulva, i.e., labia.

De Blasio observed a young woman who had upon each side of the vulva on the outer side of the labium majus a mammary gland the size of a hen's egg, surmounted by a well-formed nipple. Up to the age of puberty only the nipples were observed, the glands developing later and only reaching their maximum size when she became pregnant. The location of these supernumerary organs is precisely that seen in cetaceous animals.

Deaver and McFarland note the formation of the accessory breasts from "anlagen" extending from the axillary to the inguinal regions.

REFERENCES

- Deaver, John B., and McFarland, Joseph: The Breast, its Anomalies, its Diseases and their Treatment, 1917, Polymastia, p. 51.
De Blasio: Archivio di Psichiatria, Neuropathologia, Anthropologia Criminale Medicina legale, Torino, 1905, xxvi, 171.

ST. MARY'S HOSPITAL.

REPORT OF A CASE OF GANGRENE OF THE CECUM IN A NEWBORN INFANT*

BY LUCIUS A. WING, M.D., NEW YORK CITY

Maternal History.—Mrs. M. Z., a primipara twenty-two years of age. The mother of this infant was admitted to the Lying-In Hospital on July 5, 1925. The provisional diagnosis on admission was placenta previa.

The patient was at full term, and had noticed irregular uterine contractions together with slight bleeding from the vagina for about three hours before admission. The bleeding had increased somewhat in amount during a period of one hour preceding her coming to the hospital.

Examination showed a firm cervix, with one finger dilatation. The membranes were intact, and the placenta was not palpable. There was a continuous, moderate flow of fresh blood from within the cervix, with occasional small, dark clots.

The bleeding continued during two hours' observation. There was no further dilatation of the cervix, and the uterus became somewhat tonic. A diagnosis of premature separation of the placenta was made, and the patient was prepared for delivery by cesarean section. While preparations were being made in the operating room the fetal heart became very irregular, varying between 120 and 80. The high incision type of operation was done, and a living baby 54 cm. long, weighing 3730 grams was delivered. The placenta measuring 20 by 20 cm. was found high in the uterus, on the right side. It showed an area of separation covered with partially adherent clot, and about a pint of partially clotted blood was found in the uterine cavity. The umbilical cord was 55 cm. long, with two tight coils about the child's neck.

Mrs. Z. made an uneventful recovery, and was discharged from the hospital on the twelfth day in good condition. The mother's previous history was irrelevant. Her Wassermann reaction was negative.

History of Infant.—The baby was a well-developed male, perfectly normal in appearance. On account of the mother's operative delivery he was not put to the breast during the first twelve hours after birth. During the following twelve hours the baby vomited on several occasions, the vomitus consisting of clear fluid and mucus, slightly bile tinged. During the third twelve hours a marked abdominal distention developed, vomiting continued at intervals, and the baby refused to nurse. There was no meconium in the vomitus. No abundant stool was observed, but a colonic irrigation brought meconium stained fluid.

An exploratory laparotomy was done under ether anesthesia when the infant was thirty-six hours old. A right rectus incision was made, and upon opening the peritoneal cavity a large amount of free gas escaped, and a small amount of meconium was observed. The meconium was found to be coming from several minute perforations in the cecum, and the whole of the caput coli was found to be in a condition of early gangrene. The lower portion of the ileum was moderately distended, and filled with meconium. Further exploration revealed three peritoneal bands which passed obliquely across the cecum in its upper portion, binding it down firmly to the posterior abdominal wall. When these bands were divided, the cecum could be lifted up in a normal manner. Each band was about 3 mm. wide, and 3 cm. long, and they lay to-

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, 18, 1925.

gether like a small bundle. No further anomalies were observed. Some meconium had passed into the large intestine. The cecum was brought into the wound and secured there with several fine sutures, and the abdominal wound closed except for a drainage opening in the lower angle.

For twenty-four hours the vomiting subsided and the baby seemed improved. After this period, however, the vomiting recurred, an actively spreading peritonitis developed, and the baby died on the fourth postoperative day.

Cultures taken from the peritoneal cavity at the time of operation showed a mixed culture of *Bacillus coli* and *Staphylococcus aureus*.

OBSERVATIONS

Farr and Brunkow, in a recent article,¹ state that the incidence of intestinal occlusion from all sources is about one in twenty thousand. These authors make the comment that since many infants which die are not examined postmortem, a certain number of cases may not be recognized. It is my belief from observations at the Lying-In Hospital during the past ten years that intestinal defects are much more frequent than was formerly believed. Most observers agree that developmental faults are the most frequent cause of the various abnormalities and defects of the intestinal canal. Among additional causes may be mentioned blocking, or interference with the mesenteric vessels, infections, particularly syphilis, the development of adherent bands, and twisting of the gut. The development of an imperforate portion of the intestinal canal, either single or multiple, appears to be considerably more frequent than a stenosis due to pressure from without.

Congenital defects in other parts of the body have been frequently noted in association with defects of the intestine.

The cardinal symptoms of intestinal occlusion in the newborn are: vomiting, abdominal distention, and failure of the bowels to move in a normal manner. It may be noted with emphasis that an irrigation of the colon may bring away material which appears to be meconium stained without ruling out complete obstruction.

The prognosis in intestinal occlusion in the newborn is rather poor, although recoveries have been reported. Surgical treatment must be early to be of any value. The invasion of the intestinal canal, and subsequent infection of the peritoneal cavity is very rapid in these cases.

In the present instance the baby was delivered by cesarean section, performed while the membranes were still intact. The amniotic fluid was presumably sterile, yet bacterial invasion of the peritoneal cavity occurred early in the second twenty-four hours after birth. As stated, cultures of the peritoneal cavity taken thirty-six hours after birth showed an abundant growth of *Bacillus coli* and *Staphylococcus aureus*. So far as I have been able to ascertain, this is the only recorded case of intestinal occlusion in which the infant was delivered "sterile" and, therefore, without opportunity for the bacteria to enter the mouth or intestinal canal until after birth.

¹Arch. Surg., September, 1925, ii, No. 3, 417.

The general subject of developmental defects of the intestine is one which merits further study and observation, as many of the lesser defects are not incompatible with life, and are now being found a frequent source of digestive and other disturbances during the period of childhood, and even later in life.

114 EAST FIFTY-FOURTH STREET.

(For discussion see page 521.)

REPORT OF A CASE OF TRUE OVARIAN PREGNANCY

BY JAMES R. MANLEY, M.D., DULUTH, MINNESOTA

THIS patient, twenty-six years of age, with one child three years old, complained of pain in the lower abdomen, with a slight vaginal bleeding, when I first saw her on November 22, 1925. She stated that her last regular menstrual period was October 9, six weeks before. On November 15, while at dinner, she was suddenly seized with abdominal pain which caused her to faint, and there was slight bleeding from the vagina.

She got over this in a few days and felt well until November 22, when she had another attack of pain, not so severe. There was also some slight spotting of blood. Physical examination was negative with exception of the lower abdomen, which was distinctly tender on the left side. Vaginal examination showed the uterus slightly enlarged in ante flexion and a small mass in the left culdesac the size of a crab apple, which was extremely tender. Diagnosis was made of extra-uterine pregnancy. She was operated upon the following morning.

The operation disclosed about six ounces of free blood in the abdominal cavity; the left ovary was the site of a hematoma about an inch and a half in diameter which had ruptured. The left tube was free; there were no adhesions, and aside from a slight congestion, the tube was perfectly normal. The uterus was enlarged to about a six weeks' pregnancy and had the appearance of a pregnant uterus. The ovarian hematoma was removed and the wound closed.

The patient made an uneventful recovery, vaginal bleeding starting on the third day, about normal in amount for a regular menstrual period. The nurse stated that some membrane was passed but unfortunately it was not saved for examination.

The specimen removed was nearly round, about an inch and a half in diameter and formed partly by blood clot, which on section was shown to form about one-half of the mass, and partly by ovarian tissue in which was a large area of corpus luteum, which formed the boundaries of the hematoma. Inside of the blood clot part of the tissue was reddish gray in color, easily distinguished from the blood clot, and in the center was a cavity in which an embryo measuring a centimeter in length was found. Outside of the corpus luteum ovarian tissue could be recognized grossly, completely surrounding it, with the exception of an area about three centimeters wide near where the rupture occurred.

The microscopic description by Dr. G. Berdez was as follows: Sections through the embryo show degenerative changes, several structures, however, are easy to recognize. Sections through the corpus luteum and adjoining blood clot show that the hematoma contains numerous typical fetal villousities, which are lined by an epithelial and syncytial layer. In places the syncytium shows a very fine ciliated lining. The villousities, together with the surrounding blood, penetrate into the superficial layers of the ovary. There the ovary shows a layer of decidua-like cells, which at one place goes over without sharp transition into the cells of the corpus luteum.

Several sections in different areas show the ovarian tissue outside of the corpus luteum and blood clot. Ovarian tissue also shows several primitive follicles and also a fibrous body, an atresic follicle. Anatomical diagnosis: ovarian pregnancy.

Comment.—A primary ovarian pregnancy is the result of fecundation of the ovum while still within the graafian follicle. The conditions which must be fulfilled if the specimen in question is to be regarded as one of proved primary ovarian gestation are as follows:

1. The tube on the affected side must be intact.
2. The fetal sac must occupy the position of the ovary.
3. The pregnancy must be connected to the uterus by the utero-ovarian ligament.

4. Ovarian tissue must be found in the sac wall. Williams adds to this a fifth condition: that ovarian tissue must be found in several portions of the wall, at some distance from one another. Another condition, that the embryo itself must be found, is probably not essential.

In the case reported all of these conditions were fulfilled, even to finding the embryo within the ovary.

500 FIDELITY BUILDING.

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

THE DISTRICT NURSING ASSOCIATION OF BUFFALO

THE District Nursing Association of Buffalo, among its other activities, includes that of a maternity nursing service, which includes the care of the pregnant patient during the prenatal period as well as in labor and puerperium. This, as well as other services, is rendered free to those who are unable to pay. "The actual cost of the visit of the nurse must be paid whenever possible, and those able to pay more than the cost of the visit are required to do so."

The association has "maternity baskets" for rent to persons who are unable to procure the necessary linen, etc., for the time of confinement, for which it charges a rental fee of five or six dollars. There is no necessity for any pregnant woman in the city of Buffalo to be without nursing care. The fee is always in proportion to the means of the patient, from twenty-five cents to one dollar and a half per visit. Those unable to pay are, of course, not charged. Nurses are furnished for the period of labor for seven and one-half to ten dollars per case. The nurse is the intimate link between the patient and her physician. As every child has a right to be well born, so every woman has a right to trained nursing and medical protection.

The association has four night nurses for obstetrics. The work during the day is done, first, by one special nurse, and after she has been called on a case, nurses from the general division are called upon in turn to take care of obstetric cases. No case is carried without the consent of the doctor in attendance. If no doctor has been engaged, the family is instructed to call one. If they are unable to pay a physician, the clinic and hospital are recommended. If a midwife is to take charge, an examination at the "Prenatal Clinic" is advised, after which the nurse follows the directions of the doctor at the clinic, until the midwife assumes charge of the case. The nurses, at all times, try to make each prenatal visit one of cheer and friendliness, as well as to obtain a report of the exact physical condition without causing any fear or misgiving.

The rules governing the relations to physicians are quoted from the "Manual:"

"1. A staff nurse of the Association responds to a call without comment, but no case can be carried for longer than two visits without a licensed, medical practitioner in attendance.

"2. When there is no physician in attendance and the family is able to prove inability to pay a doctor, the nurse shall call the City Health Center for free medical care. When a family is able to engage a private physician it must make its own choice; the nurse is prohibited from recommending one.

"3. Nurses are forbidden to receive orders from patients or any member of the family, even though they are said to come from the doctor. When talking to doctors, nurses should request them to leave written orders whenever possible and especially at time they decide to call the nurse.

"4. Nurses must communicate with physician in charge at least once on every case.

"5. Nurses cannot recommend a change of physician nor can they recommend hospital treatment without consent of the physician.

"6. Excepting in case of 'special delivery nurses' no staff nurse may be used by a physician as an anesthetist."

The superintendent of the Association is Mrs. Anne L. Hansen, R. N., whose most recent report, noted below, shows the steady increase in the service for the past three years. During 1923 special nurses were for the first time employed for the period of labor. The gratifying growth of this service is an evidence of its need.

RECORD OF MATERNITY SERVICE RENDERED BY THE BUFFALO NURSING ASSOCIATION

YEAR	GIVEN PRENATAL CARE	ATTENDED THROUGH DELIVERY	POSTPARTUM CARE (INCLUDING ALSO PRENATAL CARE AND DELIVERY)
1923	1354	334	2952
1924	1849	699	2997
1925	2960	1105	3674
FOR JANUARY 1926	191	107	276
FOR FEBRUARY 1926	169	99	259

F. L. ADAIR, M.D.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS

THIRTY-EIGHTH ANNUAL MEETING

HOT SPRINGS, VA., SEPTEMBER 16, 17, AND 18, 1925

DR. ASA B. DAVIS OF NEW YORK, PRESIDING

(Continued from March)

REPORT OF THE JOINT COMMITTEE ON MATERNAL WELFARE

DURING the past year the work of the committee on Maternal Welfare has been prosecuted as it could best be done, handicapped by the conditions which have been encountered.

Dr. Schwarz has addressed several important medical gatherings in the southwest, and Dr. Kosmak kept appointments in New York, Pennsylvania, and New Jersey, dealing with the subject from various angles, medical and sociologic. The chairman was invited to appear before the Detroit Obstetrical Society, the Wayne County Medical Society, the Public Health Section of the Detroit Federation of Women's Clubs and the radio audience of the Detroit Free Press, April 7, where "Maternal Welfare" was given one afternoon and evening.

The annual meeting of the Public Health Nurses of Missouri, combined with the County representatives of the Missouri State Board of Health, was the occasion for a talk on Maternal Welfare by the chairman.

A number of district and county medical societies in Kansas and Missouri have invited members of the committee to furnish a program at some meeting during the year; whenever possible, this engagement has been fulfilled by personal acceptance. When this has been found inexpedient, it has been arranged that the service of one of our appointees in whichever state the meeting was to be held should be solicited to attend, and in every instance the response has been favorable.

We feel, therefore, that the work of the committee has become really organized and is well under way, and hence is no longer experimental.

Some idea of the appreciation of the work of the committee may be realized when we note that our report of last year was quoted by Dr. H. MacMurchy, in the 1925 Canadian Public Health Congress; abstracted by the Year Book in Obstetrics, by the Dental Cosmos, of Philadelphia, by Hospital Progress, a journal published in Milwaukee, and by editorial comment of a number of State Medical Journals, throughout the year.

In the early summer a meeting of a committee, under the chairmanship of Dr. Robert L. DeNormandie, of Harvard Medical School, was called by the Children's Bureau, to meet in Washington, to formulate a simple standard for prenatal care and obstetrical technic, and also to suggest a practical prenatal chart for general

use in the obstetrical service of physicians whose patients are confined in the home. This committee, in addition to Dr. DeNormandie, consisted of Dr. F. E. Kraker, Director of Division of Maternity and Infant Hygiene, Children's Bureau, Department of Labor, Washington, D. C.; Dr. Fred L. Adair, of the University of Minnesota; Dr. Ralph Waldo Lobenstine, of the New York Maternity Center; Dr. Frank W. Lynch, of the University of California; Dr. Florence L. McKay, Director of the New York State Board of Health; Dr. A. M. Pickett, of the University of Louisville; Dr. Otto H. Schwarz, of Washington University and your Chairman. The material for the final report is now in the hands of the chairman, Dr. DeNormandie, and will soon be ready for release by the Bureau.

A meeting of the Joint Committee on Maternal Welfare was held on the following day. This committee consists of three members from each of the following organizations—the American Gynecological Society, the American Child Health Association, and the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons. The report of the Joint Committee has already been presented to the American Gynecological Society. In this report the activities of the committee were stated and some resolutions which had been drafted were approved and recommended for adoption by the various constituent societies. Groups of states had been assigned to the various members of the Joint Committee with the idea that they should push the idea of Maternal Welfare in those states through state leaders.

These are to select speakers, associated with the constituent societies if possible, and other qualified obstetricians, to aid in the work of addressing medical and lay gatherings on maternal welfare.

Work of this type has already been done through the Bureau of Regional Consultants of New York, and that of Ohio, and of the recently elected Bureau of Missouri, under the auspices of Dr. Ira Brown Krause, Director of Welfare of the Missouri State Board of Health.

Dr. George W. Kosmak, Editor of the *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY*, announced the inclusion of a Department of Maternal Welfare to be established by the Journal, and outlined the scope of the undertaking. This is the first effort made by any medical publication to stress in a definite way our activities and we hail with delight the promise of this publicity.

In 1909 Dr. Schwarz was a member of the Committee of One Hundred of the American Medical Association, on reform of the medical college curriculum, at the meeting held in Chicago; and your Chairman attended the meeting in Baltimore of the Curriculum Committee of the American Medical College Association, as a representative on obstetrics. We were both impressed with the incongruity of the division of the time of the undergraduate student of medicine, with reference to the importance of the subjects which go to make up his hours in the third and fourth years.

No great advance was made following these meetings, and from the report made last May, before the Medical College Association, by Dean Rowland, of the University of Maryland, whose paper was published in the *Journal of the American Medical Association*. 1925, very little change has since been observed in the medical college curriculum.

It has always occurred to us that surgery in general which, for the average practitioner, is a matter of diagnosis and of minor emergencies, has been accorded an importance quite out of proportion with the other lines of work that he will have in his future practice. In relative value the ratio will be about as follows: medicine 50 per cent; obstetrics 35 per cent; minor surgery, fractures, life insurance examinations, etc., 15 per cent.

With this thought in mind in order that the schedule for the hours assigned to the various branches of the curriculum for this year could be made available for a comprehensive study of the comparative limits of the various required and

optional courses, the Chairman asked the Secretary of every medical college in the United States to send us a copy of the school's catalogue announcement. Since a large proportion of the colleges responded, the figures as presented are approximately accurate. A careful analysis agrees with the report of Dr. Rowland, that the time allotted in the college to obstetrics is about 4 per cent; and 18 per cent is the general average of the hours for surgery, exclusive of the surgical specialties.

Now let it be clearly understood that the Committee is not finding fault with the teachers of surgery for securing these hours of instruction. The contrast between the practical need, in the student's course in obstetrics, which is to become so large a volume of his life's work, and of major surgery, of which the general practitioner will make so little use, is the point emphasized. He must know his obstetrics. It comes in his daily problems and the end of each emergency may be fatal. The glaring fault of high morbidity and mortality in obstetrics, as Dr. Lynch, Dr. Newell, Dr. Davis, and Dr. Rowland argue, is that the neophyte in medicine is self-taught in obstetrics. He has forgotten the didactic lectures he has heard before his final examination and he had not had sufficient clinical training to give him control of the principles of obstetrics, necessary for the recognition of toxemia, malposition, pelvic deformity, and all the dangers he must encounter, perhaps in his first private case. Consequently he goes into the home of the unsuspecting woman who, without knowledge of his lack of training and experience, has called a doctor to care for her in her labor. In absolute contrast to the work in the hospital, where he had constant supervision, an expert in attendance to arrange his patient, he takes charge in an unknown field. In the hospital and clinic he had been dependent on the result of his diagnosis, technic, and the postpartum condition of the patient for his grades, which are to play no small part in his final examination. In the home, with little or no material for asepsis, no assistance and, above all, no intelligent supervision, he takes the chance that what he fails to do will not find him out; often this bluff succeeds, more often it fails.

Without careful measurements, or diagnosis of presentation and position, with a desire to get through and away, he becomes restless; or the family shows a disposition to want something done. He makes a vaginal examination, repeats it again and again. This expedient reveals nothing to him, but it is a basis of an assurance that "everything is all right." If the delay is extensive, he puts on forceps, without knowing whether dilatation or rotation has occurred, or he does a version with equal temerity. The result, perhaps, for the infant, an intracranial hemorrhage; for the mother, certainly, a badly lacerated cervix and perineum, and again a severe postpartum hemorrhage. The third or fourth day a chill and temperature disturb his equanimity; sepsis develops. Another death from malaria or "flu" is to be added to the maternal risk rate.

This is not an imaginary sketch, but simply an illustration as to why Dr. Lynch says the self-taught doctor adds to the score of our needless mortality.

Dr. Rowland, in his paper, quotes liberally from our Report on Maternal Welfare, 1924, as to the convincing facts of this most radical defect in teaching, and his deductions are in harmony with these we have set forth.

This subject is so vast and so essential that it can only be mentioned in a general way in our brief report. The committee would like every teacher of obstetrics to read Dean Rowland's paper, and to call it to the attention of the authorities of the schools, so that the defect in medical education may be corrected.

Dr. Lynch's ambition that each student before graduation must have attended seventy-five cases of labor, all under supervision, is perhaps Utopian, with the present amount of clinical material available; but every one should have had at least the management of thirty cases each under an instructor.

The plea of the committee is that less time be devoted to those branches of studies more or less cultural, in the curriculum, and more hours given to this one

subject, which does not now have the attention its importance makes essential. It is not expected that the general practitioner will do cesarean section, or other operative obstetrics, but he will do many phases of the work which demand a thorough apprenticeship.

The specific recommendations of the Committee are that the Association use its influence to increase the amount of obstetric teaching, so that instruction in the third year should consist of at least three hours a week, throughout the year. This to include a review of anatomy, physiology of the pelvic region, with a study of normal pregnancy and the mechanism of labor. Consideration of version, breech extraction, forceps delivery, and so forth, should not be included, but these should be taught in small classes by use of the manikin. History taking, diagnosis, and examination of the clinical patient demands at least thirty hours. During the last half of the third year, the student is to attend, as an observer, fourth year lectures on clinical obstetrics. The fourth year, group work in physical examinations in the hospital wards and dispensary are supplementary to the drill in manikin work, with which it should go hand in hand. It is imperative that the student should see as much operative obstetric delivery as possible. By visualizing the actual demonstration, he is brought face to face with the difficulties, before he is forced to assume the responsibility of the personal management of the abnormal type, dependent on his own unguided resources. Obstetrics should occupy in this scheme of curriculum 15 per cent of the hours of the last two undergraduate years in the medical school.

There are several subjects which preeminently demand consideration by our Association. The committee has chosen "The Teaching of Obstetrics" as the topic to emphasize in 1925-1926, as logically following the survey of this last year.

Henry Schwarz, M.D.

George W. Kosmak, M.D.

George Clark Mosher, M.D., Chairman.

A paper on **Precancerous Lesions in the Uterus**, was read by Dr. PALMER FINDLEY, Omaha, Nebr. (For original article, see page 450.)

DISCUSSION

DR. HENRY SCHMITZ, CHICAGO, ILL.—The question arises in my mind, how can we utilize the message that Dr. Findley has brought to us today? I feel that as long as the diagnosis of carcinoma, even the time of treatment, is left to the general practitioner or to those outside of our specialty, we will always have to contend with conditions as they exist at present. How can we correct this? Let us begin in the medical school and imbue the students and practitioners with the necessity not to treat diseases that require a special training. Let us train general practitioners first and specialists afterwards. If a general practitioner should decide to enter a specialty, then let him return to the medical school to receive adequate training of at least three years in his chosen specialty.

DR. HERMAN E. HAYD, BUFFALO, N. Y.—I agree with the Doctor that every suspicion of traumatism of the cervix is potentially a subject for most serious consideration. I think it is a very dangerous thing to leave abrasions and erosions. For instance, I have twice curetted where there was no pathologic condition of the cervix—perhaps simply for a dysmenorrhea—and after a lapse of five or six years an epithelial cancer resulted on that surface, without any question being a result of the traumatism from the dilatation.

DR. JAMES E. DAVIS, DETROIT, MICH.—I appreciate this paper very much because it attacks a subject that needs to be dealt with almost every day in

hospital work. As I see it, there have been two extremes taken by physicians: one is occupied by the exclusive laboratorian, and the other by the exclusive clinician. The first may say that the diagnosis should be made only with the microscope; the second perhaps dwells exclusively upon the symptomatology. Those are the two extremes and we will not get very far proceeding with such extremes or if we teach, as we have been doing in the majority of schools, that the students must learn cancer from the microscope or from the patient when he shows definite symptoms. Particularly has the symptom of bleeding been emphasized over and over again, and the presence of the tumor. As you all know, when there is tumor and bleeding then the case is so far along that it is not much use in making a diagnosis, speaking from the patient's standpoint. All over this country, and in most other countries, there has been neglect in teaching gross pathology and I am sure from the student's standpoint—both the undergraduate and the postgraduate—there is neglect of the opportunity to correlate what is clinical with that which is gross and microscopic pathology. As I see it, if we are going to improve our resources in this particular we must proceed along different lines. I believe less time should be given to training the student in microscopic diagnosis and much more time in the training of gross diagnosis, and the correlation of the gross pathology with the clinical findings, and after that the confirmation, if you will, with the microscopic picture. If we can get those three impressions in the minds of our students we will then begin to progress in this particular.

It is a most difficult problem to diagnose cancer where there is no tumor. Even if we have the three conditions present that Dr. Schmitz has spoken of, I would add two more: one, in cancer the cell never reaches maturity; and, secondly, the cell or cells begin to degenerate early. So there are really five different phenomena that you can note.

DR. WM. SEAMAN BAINBRIDGE, NEW YORK CITY.—There are some facts concerning cancer which are definitely recognized. For example, we know, today, that irritation does cause cancer. This has been demonstrated in experimental work on animals and, to a more limited extent, on man. In cancer of the cervix, the primary irritation may be caused by the work of the surgeon, the obstetrician, or the gynecologist. True, the scar on a cervix may not prove the direct cause of the cancer, but the irritation of neighboring cells by the scar tissue, may prove an indirect factor in the production of cervical carcinoma. As we know, it is not the fibroid itself, as a rule, but the irritated tissue in the vicinity of the fibroid, which becomes the cancer site.

The first danger, therefore, in the use of caustics and electric applications to the cervix, is that of unduly producing scar tissue, followed by irritation of the cells in the neighborhood, epithelial proliferation and, finally, cancer.

Another aspect of the application of these measures to the cervix is that of terminating an early pregnancy in the patient. Twice, recently, I have known of such cases, one of which may assume a medicolegal character.

The third menace in the application of caustics and electric treatments to these erosions of the cervix is that it may cause sterility, thus endangering the individual's happiness and, possibly, her health as well.

In the use of these measures as applied to precancerous erosions of the cervix, one must consider the apparent disadvantages as well as the advantages involved, and it seems to me that among the most obvious of disadvantages, are the three which I have just cited: the possible termination of an early pregnancy, irritation of the cells adjacent to the cervical scar tissue and the likelihood of producing sterility. However, in carefully selected cases I have been employing the cautery for cervicitis with distinct benefit. With Dr. Findley, I feel that the method has a real field of usefulness.

DR. A. J. RONGY, NEW YORK CITY.—I have not seen a single case of cancer of the cervix during the past year. That is not my experience only but also the experience of those who practice among the Jewish people. It is not at all a problem in our hospital service. I have been in charge of a large gynecologic service for twelve years and we seldom get a case of cancer of the cervix, either early or advanced. Whether it is the sexual regulations, instituted thousands of years ago, that have something to do with this, I don't know.

I think gynecologists have been very negligent so far as the treatment of the genital tract is concerned. A sore is never allowed to remain unattended by a surgeon, but a gynecologist will let a sore on the cervix go on for months or years. That, to my mind, is a great mistake. While we do not know the cause of cancer, I cannot see how we can rationally allow an ulceration of the cervix to go on untreated.

For the past year or two I have treated every case of ulcerated or lacerated cervix by the electric knife, not so that the knife destroys the cervical tissue but sufficiently to destroy the irritated and inflamed surface so that at the end of six weeks a new mucous surface is formed and the discharge is practically stopped.

DR. MILES F. PORTER, FORT WAYNE, IND.—I believe one reason that we have made so little progress along the line of understanding cancer to the end of curing it is because we have been paying too much attention to the laboratory and not enough to the clinical findings, and I want to emphasize what Dr. J. E. Davis has said. I believe that our hope lies in teaching our students the gross appearance, the clinical aspects, not of early cancer alone but of potential cancer. When we do that and depend less upon our laboratory findings I believe our statistics will begin to grow better.

I want to cite just one incident. Within the last two months a section of a questionable lesion was sent to three of the best laboratories in this country, including New York and Ann Arbor, and the result was that we got three diametrically opposite reports. One report was that it was an entirely benign affair, and it was so long before we got the report back that by that time it was evident the patient was going to die of malignancy, and we didn't need the laboratory report. I don't want to underrate the laboratory facilities, but I do want to emphasize the importance of curing these cases before they develop into cancer.

DR. FINDLEY (closing).—Answering Dr. Polak's question about the treatment of endocervicitis, I have tried everything and am now resorting to the electric blade. I think if we do away with the discharges due to the so-called endocervicitis, the erosion will take care of itself. The discharge will be increased for the first two or three weeks. I have been satisfied so far with the results I am getting from the electric cautery. I don't know what the remote results will be.

DR. POLAK.—Do you use it as a circular application?

DR. FINDLEY.—By no means. I go from the internal os back to the external os. I burn fairly deeply through the cervical mucosa after dilating the cervix the width of the knife. I take in the four points of the compass. I do not believe there is much danger of stenosis.

A Case of Gangrene of the Cecum in a Newborn Infant was reported by DR. LUCIUS A. WING, New York City. (For original article, see p. 510.)

DISCUSSION

DR. H. O. PANTZER, INDIANAPOLIS, IND.—The case described by Dr. Wing represents an extreme degree of the type of anatomic deformity which in my observation prevails in more than 90 per cent of all cases of appendicitis that

come to operation, irregularities, which dislocate, constrict, twist or angulate variously the appendix, cecum, and adjacent ileal loop. These abnormalities, I deduce, are primarily owing to faulty application during fetal growth of the peritoneum to these organs. The parts thus afflicted are disturbed at once in their physiology, and in time—being *loci minoris resistentiae*—they become the seat of infection. If at operation the appendix alone is removed and no attention is given to these constricting bands, the patient may make a good surgical recovery, yet continue to have the symptomatic distress of the preoperative period. In my appendicitis operations, I have bestowed attention to these peritoneal constrictions for more than twenty-five years, and as a consequence have found relatively few cases that continued the symptomatic disturbances in these parts.

Moreover, these anatomic irregularities can be recognized in the adult with palpation, practiced as do the blind palpate. A dislocated, angulated, compressed, widened or thickened, and tender cecum, and an angulated, thickened, tender near ileal loop, can be made out distinctly by such procedure. And, what is of paramount interest, when such conditions are found, evidence of their existence since birth is obtainable, namely 19 out of 20 times, when I ask the mother of such a person, did this child cry the first year, the response will come, "Yes, right from the first day, and through a long year." Furthermore, asking the patient: "Has there been suffering—such as fugitive colic, tenderness, distention in these parts, off and on through the years?" will oftenest bring an affirmative answer. The essence of all this: let us look for evidence of such conditions in the infant, and where found, resort to operation during the first year of infantile life when the operation would entail only the snipping of a few peritoneal bands, here and there. This procedure *then* relieves not only suffering at once, but also obviates the suffering through long years which yet may eventuate ultimately in the crises of an acute appendicitis, intestinal obstruction, malignancy, etc.

DR. WING (closing).—Some pediatricians have discovered through radiographic studies that there is considerable variation to be found in the conformation of the intestine.

My idea in reporting this case was that apparently this type of lesion is very rare. I have seen about a half dozen cases of imperforate portions of the intestinal canal. The difficulty always is with infants that before the diagnosis is arrived at the infant has developed a peritonitis and there is very little to be done.

A paper on **Extrameatal Prolapse of the Urethra** was read by Dr. W. T. DANNREUTHER, New York City. See page 468.)

DISCUSSION

DR. HERMAN E. HAYD, BUFFALO, N. Y.—I have never seen such a marked extrusion as in this case, but I am sure we have all encountered the lesser degrees. Unless the condition were marked, it seems to me that it would be very rarely necessary to employ this very ingenious surgical procedure which has been shown.

I used to treat the condition by touching the mucous membrane with chromic acid on a wire, just as we used to treat a slightly hypertrophied condition of the mucous membrane of the nose. That was not satisfactory because the acid ran and therefore produced a good deal more reaction than was necessary. The last few years I have been applying, and with a great deal of satisfaction, the electric wire. It seems to me that an operation of this character, if it be used frequently will result in strictures.

DR. DANNREUTHER (closing).—We need not worry about subsequent stricture in these cases because the stroma is not involved; it is the mucosa only that is prolapsed. I believe that it is wise to operate early on acute cases because of the

tendency to thrombosis. In this specimen particularly, the histopathology was enlightening and impressed upon me the necessity of removing these thrombi. With regard to lesions of the chronic type, which are insidious in onset and tolerated by the patient for some time, I agree that conservative measures should be tried before resorting to radical treatment.

DR. E. P. SLOAN, BLOOMINGTON, ILL., read a paper on **Duodenal Ulcer from Partial Obstruction at the Duodenojejunal Junction**. (See page 492.)

DISCUSSION

DR. WM. SEAMAN BAINBRIDGE, NEW YORK CITY.—Cases with distinct kinking at the duodenojejunal junction are not very rare but, in spite of this fact, I believe we fail to recognize this condition as often as we should. This, doubtless, is due to the fact that we examine our patients in a prone position, and it is impossible fully to study anatomy, on either the living or dead, with the individual in this position. If it were always possible for us to visualize the patient upright, naturally, we should be able to form a mental image of the many kinks and angles which are to be found associated with the intestinal tract. We could, also, be able to separate better those which are normal and those which may cause symptoms.

(To be continued.)

OBSTETRICAL SOCIETY OF PHILADELPHIA

STATED MEETING OF MAY 7, 1925

THE PRESIDENT, DR. BROOKE M. ANSPACH, IN THE CHAIR

Symposium on the Obstetric Forceps

DR. WM. E. STUDDIFORD OF NEW YORK (by invitation) demonstrated the instrument of **Barton**, of Plattsburg, N. Y.

DR. RICHARD C. NORRIS described the **Dewees Forceps**, DR. E. A. SCHUMANN, the **Kielland Forceps**, and DR. E. B. PIPER a **Special Instrument Designed for Use on the Aftercoming Head**.

Dr. Norris spoke as follows:

With the ever increasing popularity, usefulness and safety of cesarean section and the effort to substitute routine version for natural delivery, together with the widespread use of pituitrin in delayed labor, it would seem that the forceps would in the future run some chance of being relegated to the obstetric garret. In the past this instrument, unwisely and destructively used oftentimes, has nevertheless been a blessing to countless women and unborn children. Wisdom can only follow knowledge and experience and it seems fitting that our Society should give an evening to a discussion of the old and well chrystallized principles of the obstetric forceps and a review of the newer ideas and instruments that have appeared in recent years.

By way of introducing the topic of forceps deliveries may I stress the particular dangers to the mother. The modern method of "protecting the perineum" to use the old phrase, has placed in our hands the operation of episiotomy, which I believe

should be used in almost all primiparae and most multiparae whose previous lacerations have been repaired. The central operation, is the one of choice in my hands, incising from a point where one feels the ridge of the constriction on the posterior vaginal wall, down to the sphincter, manually dilating the sphincter in many cases and protecting it always with a temporary figure of eight stitch through its anterior margin. This opening of the door and securing a very slow exit for the visitor, and appropriate closure is salutary to all parties concerned and examination of the patient after a month or two rewards one for his temerity. Not so, however, with what I shall call the upper pelvic diaphragm, after one has unwisely resorted to his forceps too soon. The vesicouterine and uterosacral ligaments, the cervix, bases of the broad ligaments and of the bladder, and the upper third of the vagina, cannot be handled so deftly by any procedure at our command save only cesarean section. Dührssen's vaginal hysterotomy was a step in this direction but its difficulties and dangers prevented its popularity. As gynecologists we know that extensive damage to this upper pelvic diaphragm, cannot be repaired perfectly by any operation yet devised. In view of this fact, we must realize that no forceps can be invented that will dispel this limitation to its use. Until some one is bold enough and skillful enough to open a door through this upper plane for the first step in the exit of the child, and close the door with the same facility and success as attends the passage through the lower perineal plane, there is but one resource,—preparatory dilatation, safely, slowly, intermittently and with obstetric patience, which is the *n*th degree of that quality so rare in these days. In obstetric practice I find the necessary degree of patience can best be attained by watching a clock which I think should have a prominent place in the equipment for every forceps delivery. This is a convenient means to time the intermittent duration of tractions and release of compression and even the experienced operator will find this precaution a salutary check upon his speed. Since 1877 when Tarnier presented his final axis traction model for high arrest of the head, the value of the axis traction principle has generally been acknowledged and in recent years most obstetricians utilize this principle in all forceps deliveries up to the moment when the mechanism of labor requires the final movement of extension of the head over the perineum and through the vulva. As time passed and major degrees of pelvic obstructions were recognized in advance of labor and treated by the improved cesarean section, the dangerous features of the Tarnier instrument to the child—the too close approximation of the blades and their tips, and their great power of compression and consequent injury to the head, were recognized. Major disproportion was discovered before the onset of labor and no attempts were made to use forceps for such cases. From that day the popularity of Tarnier's forceps began to wane. The value of the principle of axis traction, however, remained and the application of that principle to all types of forceps became popular. It was during this period that Dewees, after several years of concentrated study of physics and dynamics as applied to the obstetric forceps, gave up his practice and became a peripatetic and somewhat pathetic figure, as he visited various parts of the country in his efforts to have his work appreciated. He once came to see me and the inventor's enthusiasm had so possessed him and my conservative principles had so possessed me, that my reaction to his visit was to utterly fail to appreciate the value of his instrument. Several years after the visit his death occurred before his work or his forceps had received recognition and his forceps had brought him only disappointment. Believing, as I do, in the unquestioned advantage of an axis traction instrument in all forceps deliveries, Dewees forceps soon demonstrated its great advantages. The shape of the blades, the cephalic and the pelvic curves, their generous grasp of the head with a minimum amount of compression, the length of the instrument,—ample for all deliveries except the very high arrest of the head which itself speaks against an attempt at forceps delivery,—the evident

utilization of accurate axis traction, which we can feel and later see as the delivery advances,—all these qualities convinced me of its great value. Besides this, I soon learned in delivering arrested posterior occiput, that the instrument was especially valuable to favor flexion of the head, so essential in these cases. The tips of the blades are placed well back on the occiput, the handles being carried upward and toward the patient's opposite thigh. The forceps is then held in this position of elevation with the left hand while the right hand makes the traction on the handle bar. During this traction as the head descends, the tips of the blades will cause the occiput especially to be drawn downward and increase the flexion. When the head is well flexed, as shown by palpating the posterior fontanelle, has reached the pelvic floor and is beginning its anterior rotation,—but not until then,—the traction handle is loosened at its attachment, enough to swing to the median line. Traction is now made in the median line, directly outward, and the left hand upon the forceps handles gently sweep them intermittently through the arc of the circle that secures a slow and safe Scanzoni anterior rotation of the occiput. The use of Dewees forceps in this manner in my hands has given me greater satisfaction in the delivery of occiput posterior positions, than any other instrument I have ever employed and adds distinctly to its value. With a year's satisfactory experience with the Kielland forceps, for relatively high transverse arrest of the head, I feel that the instruments of Dewees and of Kielland, have made the Tarnier instrument, obsolescent in recent years, now obsolete, and I am convinced that skillful forceps deliveries with one or the other of these two types of instrument in appropriate cases, will continue to express in the highest degree the artistic accomplishment of the well trained obstetrician.

With the surgical environment of hospital obstetrics, after the head has dilated the upper pelvic diaphragm and the upper third of the vagina, the routine use of the forceps and episiotomy, to shorten labor, diminish the suffering of the mother and conserve the best interests of the infant, far surpass, in my judgment, the much extolled routine use of version, which, as practiced today, attempts delivery through an insufficiently dilated upper pelvic diaphragm.

DR. EDWARD A. SCHUMANN presented his **Observations Upon the Use of the Kielland Forceps.**

The forceps invented by Professor Kielland embody a wide deviation from the models in common use in that they were conceived for use primarily as rotators and flexors, the element of traction being a secondary consideration.

The Kielland forceps possess three distinctive features: there is no pelvic curve, the blades forming an almost straight line with the handles although made with a slight offset, in a somewhat bayonet shape; the lock is a sliding one, permitting the blades to be applied at different levels upon a head in marked asynclitism and the handles are long and slender to prevent too vigorous traction.

A great deal of controversy has arisen regarding these forceps, one group of obstetricians advocating their use to the exclusion of all other models while another element of the profession vehemently denies any possible advantage in the new design. This conflict has waged with great fury in Vienna where violent differences of opinion are expressed both in debate and in the literature.

As is usual in such circumstances the views of the inventor of the forceps are entirely ignored and his indications for their use are not considered.

Inasmuch as the deviser of a new instrument is presumably the person best qualified to speak upon its advantages and limitations, I have consulted Kielland's original paper for instruction and in my own practice have adhered rigidly to his technic and indications for its use.

The title of the paper in question, at once explains the purpose of the forceps, "The Application of the Forceps to the Unrotated Head with a Description of a New Instrument and a New Method of Application." (Kielland, Ch., *Monatschr. f. Geburtsh. u. Gyn.*, 1916, xliii, p. 48.)

The principal indication for the employment of this instrument, then, is a head arrested high in the pelvis and engaged in the transverse diameter of the basin.

Kielland lays especial stress upon the necessity for absolutely accurate diagnosis as to the position of the head and goes so far as to say that his forceps are not to be used by those who are not competent to make an accurate diagnosis as to presentation.

The most noteworthy feature of the instrument and the one which most commends it is the ease with which a true application of the blades may be made to the sides of the head when the latter is arrested high in the transverse diameter of the pelvis.¹

My own experience with the instrument leads me to the following conclusions as to its value:

1. The field of usefulness is at best a small one, since the forceps were devised to facilitate the extraction of a head impacted at the pelvic inlet. Inasmuch as the whole trend of American obstetric practice is strongly opposed to delivery by forceps under these conditions, cesarean section being the procedure of choice, the opportunities for the employment of Kielland's device are sharply restricted.

2. The usual untoward results of high forceps deliveries apply for the most part to extraction by means of this instrument. Fetal intracranial hemorrhage, maternal sacroiliac relaxation and the possibility of the production of vesicovaginal fistulae, being noted with about the same degree of frequency as when the ordinary type forceps are used.

3. When, from the nature of the case, high forceps delivery offers the only means of terminating labor, the Kielland instrument is vastly preferable to any other type. Application is simple, entrance of the head into the oblique diameter of the pelvis is facilitated and fetal traumatism is minimized by its employment. Indeed, the performance of craniotomy may unquestionably be averted, in many instances.

4. The Kielland forceps is an instrument designed for use by practitioners trained in obstetric diagnosis and technic. Its substitution in general use for the ordinary axis traction types of forceps is to be strongly decried.

DISCUSSION

DR. B. C. HIRST.—Dewees brought his original model to me, which I condemned and showed him how to correct the faults. I believe I am correct in saying that everyone who used Tarnier's forceps and then tried the Dewees has discarded the Tarnier. I also believe the Barton forceps will surely supplant the Kielland forceps. If one conceives the position of the transverse head in the superior strait directed at an angle of 5° downward and backward it is at once apparent how much better grip this forceps takes than the Kielland forceps. It is also much safer.

DR. WILLIAM R. NICHOLSON.—I agree that the patient's legs should be held by the nurse or assistants, instead of using any mechanical contrivance, not only from the standpoint of the woman's subsequent comfort, but also because the application of the instrument is often greatly expedited, and the force used in delivery may often be lessened, since by a change of position of the legs under direction of the operator, appreciable increase in the various diameters of the pelvis may be obtained.

With regard to the Kielland instrument, I cannot speak from personal experience. Theoretically I can say that I do not believe that any instrument is to be advocated

¹The technic of the application is described in detail in the July, 1925 issue of this Journal.

in a primiparous woman, with the head arrested at the superior strait. This, to my mind, is a distinct step backwards. Not that it is not possible to deliver a certain percentage of these cases with instruments, but that it is not the safest and best way to do it. At the present day the safety of the cesarean operation, even after a sufficient test of labor, has been definitely demonstrated. If we open the abdomen to remove a chronically diseased appendix which will never be the cause of the woman's death, even if it is not removed, why should we not open the abdomen to remove a living baby? In other words, I believe that the purpose for which these instruments were devised is an illegitimate indication for their use, and I have no question that if enough interest is excited in the minds of the general practitioner, the use of these instruments will result in unfortunate sequella, both to the mother and baby.

The modification of these instruments, the Barton forceps, as shown here tonight, decidedly appeals to me, if they are to be used only after the head has well entered the pelvic cavity. This, to my mind, is a differential point as regards the use of any form of forceps. I can readily understand that with a transverse head in the pelvis, this hinged forceps may well be a distinct addition to armamentarium. My own particular preference, up to this time, is the Dewees instrument, as it is the safest instrument for the baby, in any part of the birth canal, between the brim and the perineum.

I believe that this Society should definitely go on record as warning the general profession that the use of the obstetrical forceps before the head has passed the brim, is bad obstetrics, unless the case has been neglected before being seen, and any abdominal operation is therefore contraindicated. In other words, I personally feel that forceps at the brim is not to be considered as an alternate to cesarean section, but as an alternate to craniotomy.

DR. JOHN A. McGLINN.—I confess, that with experience, I use forceps very much less than I formerly did. The majority of cases are difficult and they are trying on the individual who uses the forceps and often more trying on the patient and baby. We are so apt to use forceps where forceps should not be used, and more often to use forceps before the time approaches for their use. Simply because the woman is in labor for a comparatively long period of time does not necessarily mean, that in the interest of the woman or baby, she must be delivered by the use of forceps. Twilight sleep has showed that many cases can be saved from forceps by putting the woman to sleep, giving her rest, and allowing normal forces of labor to come into action again. So often we are called to deliver women before adequate dilatation of the cervix. I find now the majority of men have learned their lesson and there is not the great demand for forceps application as formerly. The Kielland I think is an advance on the Dewees. It seems to me that from the practical standpoint, as far as forceps are concerned, the difficulty in their use by the average doctor is that he knows nothing about the mechanism of labor.

DR. WILLIAM E. PARKE.—Every one who has used Kielland forceps when properly applied knows that the handles press far back on the perineum. The Barton forceps seem to avoid that. During the demonstration it occurred to me that one would have to have pretty strong fingers, stronger than I have at least, to press the head down. I know the amount of haul one puts on Kielland, or any forceps, and in order to get pull in the direction of the axis of the inlet it would seem to me to require a great deal of strength in the fingers.

DR. STUDDIFORD (closing).—I have used the Dewees forceps with a great deal of success. I think there is no better forceps than the old Simpson forceps. It has never been equaled by any forceps I know of and the axis traction forceps of Dewees has added a great deal to its value. Now we have to use the new Barton

forceps in that type of women that is increasing I think in frequency, rather short, with heavy pelvic bones, with a bad inclination of the promontory that you could not reach if you had your whole hand in. They are apt to rupture their membrane early. They have weak first stage pains, with slow dilatation of cervix, usually with a great deal of pressure on the anterior wall and the head partially engages and sticks. One trouble with these cases is the fact that they are unable to "push the head around the corner" and take up all the room that they have in their pelvis, and the Dewees and Kielland forceps by their traction, which necessarily must be downward and against anterior wall, fails to take up that room. With the Barton forceps, if you shift position of the head so that the sagittal suture is directly in the axis, the head drops into the cavity. If you cannot do it that way you better take your forceps off and do something else.

DR. RICHARD C. NORRIS.—I claim that the Dewees instrument is not to be used in competition with either the Kielland or Barton forceps. It is not meant for high transverse arrest of the head. It is to be used for the ordinary mid and low forceps operations and is of especial value in posterior occiput positions. In using the Kielland forceps you must pull directly downward and that means you are pushing the handles against the perineum and anus. This is so inconvenient and so dangerous from the standpoint of contamination of fingers and instrument, that I had my head nurse construct a rubber apron so that this part of the forceps and one's hands do not come in contact with the anus. This seems to be a disadvantage as compared with the Barton forceps which has the handle away from the anus and perineum. To effect delivery with the Barton forceps, an axis traction push is applied; I believe that is the principle of this forceps' success. With the Kielland instrument an axis *pull* is attempted. With the former you push the head back into the hollow of the sacrum. As soon as I saw the Barton forceps I could see its probable advantages over the Kielland forceps, if one can push hard enough to bring the head into the pelvic cavity. Dr. Schumann did not bring out that the Kielland instrument has a pelvic curve and the rule in using Kielland's forceps is to have the pelvic curve toward the occiput. To get the pelvic curve in the right direction you must remember that the small button on each blade locates for you the direction of the pelvic curve. Also when applying the second blade one must do so as to permit locking of the blades. If the occiput is towards the right you must have the buttons towards the right and *vice versa*. The anterior blade will then be the one that goes behind the symphysis. The value of the Kielland and of the Barton instrument too, is in the cephalic application. Any compression you make on the child's skull is where you want it. If you tear the mucous membrane away from its attachments by violence, no matter what forceps you use, the patient is injured. Now there is no question in my mind that this instrument replaces Tarnier's instrument entirely, and theoretically I can see how the Barton forceps with its axis push should be even more efficient than the Kielland. As to forceps on the aftercoming head, I agree with Dr. Piper. Why not routinely save effort and injury to the child and deliver with forceps the aftercoming head? I believe forceps to the aftercoming head would prevent cervical, spinal and other injuries. It would be important to the routine versionists to have a good forceps built for the purpose of getting out of difficulty in extracting the head in some of the miscalculated Potter's routine versions. I don't see why in all aftercoming heads there should not be an instrument at hand to gently extract the head over the perineum after a median episiotomy in primiparae with rigid outlets.

JOINT MEETING OF THE OBSTETRICAL SOCIETY OF
PHILADELPHIA AND THE PHILADELPHIA
PEDIATRIC SOCIETY

November 10, 1925

DR. P. BROOKE BLAND read a paper entitled **Injuries to the Infant During Delivery.** (See page 477.)

DISCUSSION

DR. RALPH M. TYSON.—Recently I had occasion to see two very interesting cases. One was that of a child born at home. The labor was sudden of onset and the mother was standing erect when the child was born. The baby dropped to the floor with sufficient force to tear the cord. Bleeding from the cord was small in amount. The baby was brought to the hospital later with definite symptoms of intracranial hemorrhage. Ocular symptoms were present, indicating some injury, possibly at the base of the brain. There was also hemorrhage into the vault of the pharynx. The x-ray picture of the skull was negative for fracture. A similar case, but without the history of injury, was that of a baby who developed symptoms and signs of cerebral hemorrhage when two weeks old. The x-ray picture in this case showed a definite fracture of the base of the skull.

DR. NORRIS W. VAUX.—As regards injury to the after-coming head in breech cases, we no longer extract the head by traction on the mouth but use a special forceps devised by Dr. E. B. Piper and have seen no brachial or tentorial injuries since.

DR. EDWARD A. SCHUMANN.—This comprehensive analysis of injuries to the newborn leads naturally to the question of what is to be done to prevent such injuries in the future. The delivery of a baby with a cranial injury is an indictment, not of the particular physician, but of the entire guild of obstetricians, because I feel that our teachings in regard to birth passages are entirely faulty. McColls in the early part of the nineteenth century described the pelvimeter, and if the measurements conform to a certain standard, we assume that they will probably permit the passage of the child without injury. Every obstetrician can recall numerous instances where this was not true, owing to some minor degrees of disproportion or variation in the molding of the child's head. Have we anything to substitute for pelvimetry? Nothing, as yet. It is my belief that with x-ray diagnosis, the possibly somewhat cumbersome plan of determining mensuration of pelvis and fetal head may possibly offer a solution.

DR. PHILIP F. WILLIAMS read a paper entitled **Vulvovaginitis in Infants and Young Children.** (See page 487.)

DISCUSSION

DR. CAMILLE J. STAMM.—Hospital epidemics are serious, and an epidemic of gonorrhea among newborn infants in a maternity hospital is especially so. During the months of August and September and the first ten days of October,

1924, there were delivered in the Jewish Maternity Hospital, 232 women. About the third week in August, several of the babies developed fever and a slight rash. A day or two later there was swelling of one or more joints.

We immediately tried to determine the cause. All sorts of local applications were used in the treatment of these diseased joints but were apparently of no avail; some joints were incised, smears taken, and staphylococci reported; others were aspirated and smears taken and staphylococci reported. Then other cases appeared at our postnatal clinic.

We tried to determine the source of the infection. Blood cultures were taken from joints, and by a process of elimination, a pure gonococcus was obtained. Vaginitis developed among some of the female infants.

We sent our social workers out to see what had happened, and by the time we got through we had collected in all 68 cases of gonorrhea among the infants. We had been using a Ziegler clamp in the hospital on the cord and we thought probably the clamp was the means of carrying the infection. We cultured the clamps and found nothing. We then discontinued using the nursery, and all other infants were placed in another nursery and all clothing, bed linen, etc., used in the nursery were sterilized. From that time infection ceased.

We then believed that someone in our midst was infected and investigated further, finally convincing the nursing force in the hospital that it was absolutely essential that we find the source of this infection. Smears from all the female nurses and help in the house were negative, except from one colored woman employed in the laundry. While this was a possible source we could not be sure, because at the same time we had two women in the house who were having a rather stormy time; while not really septic, they were not running the kind of temperature our patients usually run. They were private patients, and we did not feel justified in investigating them as if they had been ward patients. The doctor in charge assured us there was no neisserian infection. We took his word for it.

During this epidemic every joint in the body was involved: toes, fingers, wrists, ankles, knees, elbows, shoulder joints, hips, and spine. One child showed a record of nine joints involved at one time. There were however, a large number of cases of vaginitis which failed to show any further complications. We had proctitis complicated by ischiorectal abscess, and one child, delivered by cesarean section, was unfortunate enough to have gonorrheal proctitis, later developing a hip joint complication.

It was definitely decided that the hospital should be closed; that no more women should be admitted; that we should bring back all of the infected babies whose mothers were willing to bring them, and that we should treat them in our own institution.

In a survey 232 homes were visited and 68 infected babies found. In the case where the lower genital tract was infected all known remedies were used and the result was the same. We made vaccines. We had complement-fixation tests to confirm the fact that it was really a gonorrheal infection, but the real work was done from October 8, 1924 to about the first week of February, 1925. We were closed during the entire period and did nothing but take care of these sick infants.

When we thought the babies had reached such a stage that it was better to treat them in the dispensary, rather than in the hospital, we discharged them and they were sent to Mount Sinai Hospital, where they were treated with electricity and orthopedic appliances under the direction of Dr. Cooperman. We employ to this day a nurse who does nothing else but visit the homes of these babies to see how they are getting along.

We had two cases of ophthalmia; the one is blind in one eye, and the other made a complete recovery. There were 27 males and 41 females infected. Proctitis occurred in 7 males and 2 females; of the male children, 7 cases were complicated by ischio-rectal abscesses; the females had none. Of uncomplicated vaginitis we had 10 cases; of complicated, 30. At the present time 23 of these are clinically negative. There was one premature child with gonorrheal infection; it died. Also, there was the child that I mentioned before with nine joints involved, plus vaginitis and spine complications, who died of pneumonia at the Philadelphia General Hospital.

Joints were involved as follows: Shoulder joint—male 6, female 6; elbow—male 5, female 5; wrists—male 9, female 14; fingers—male 5, female 7; hips—male 6, female 6; knees—male 12, female 12; ankles—male 6, female 11; toes—male 3, female 7; spine—female 3; ophthalmia—male 1, female 1. Cases under treatment—male 2, female 11; under observation—male 9, female 15; unimproved—female 3.

After we closed the hospital to treat these babies, we had the mothers come back to nurse them; we fed the mothers and paid their carfare to and from the hospital, and during the four and a half months that we were closed, we spent nineteen thousand dollars. That is what that one particular epidemic cost us in dollars and cents. When we discharged the children we cleaned the institution from top to bottom, scrubbed the walls, repaired the plaster, and painted the entire place.

When we were ready to open we made some new rules, hoping to prevent future outbreaks. We found only one thing we could do; insist that every patient admitted to the hospital for delivery have urethral, cervical and vaginal smears taken; that the smears be examined by our pathologist, and that said smears not be taken before the eighth month.

DR. CHARLES MAZER.—As to vulvovaginitis in children, I wish to give my personal experience, covering a period of nine years in active gynecologic practice.

First, I wish to emphasize the fallacy of laying too much stress on a negative smear. During the first two or three weeks of the infection, we get the characteristic intracellular organisms. Following the acute stage of the disease, we are rarely able to demonstrate the gonococcus in the vaginal smears procured by the usual methods. A larger number of positive smears during the chronic stage are obtained when the vagina is distended with sterile water by means of the jumbo syringe and the washings, thus obtained by aspiration, are examined after sedimentation.

To illustrate the fallacy of depending on negative smears, I shall cite the case of a woman whose two children were treated in the gynecologic clinic of the Mt. Sinai Hospital for vulvovaginitis. After many weeks of probation, the children were discharged as cured. Later on the mother brought one of the children to the hospital for a tonsillectomy. She held a poorly corked bottle of the child's urine in her hand when someone hit her elbow, and a drop of the urine entered her eye. Within twenty-four hours she developed a virulent gonorrheal ophthalmia. Enucleation of that eye was performed within two weeks after the onset of the infection.

We do not regard the repeated absence of gonococcus in the smears as a cure. We search for pus cells and attach great importance to the clinical condition of the affected parts.

The usual method of instilling argyrol under ordinary pressure by means of the medicine dropper is futile. The method used by Dr. Wachs and the speaker is as follows: The vagina is washed with a jumbo syringe of a two or three

dram capacity until the mucosa is free from secretions. An antiseptic solution is then instilled under pressure, whether it is argyrol, Dakin's oil or acraflavine mattering very little. The child is put in the Trendelenburg position during this procedure. The important thing is that these antiseptics be brought into contact with the vaginal mucosa that was primarily freed of tenacious secretions.

A considerable number of these patients were permanently cured by direct application of silver nitrate and tincture of iodine to the cervix through a Kelly cystoscope. Very frequently the cervical infection is responsible for the chronicity of the condition.

A DELIVERY ROOM MIRROR

BY HOWARD F. KANE, A.B., M.D., F.A.C.S., WASHINGTON, D. C.

FOR the purpose of keeping the anesthetist informed as to the progress of the perineal portion of the second stage of labor, the use of a mirror suggested itself.

The mirror is placed at the foot of the delivery table and adjusted to a convenient angle. This permits the anesthetist to watch the effect of each uterine contraction and to administer the anesthetic according to the need of the moment. The view of the vulva and perineum is improved by placing a douche pan under the patient's buttocks as soon as the perineum begins to bulge.

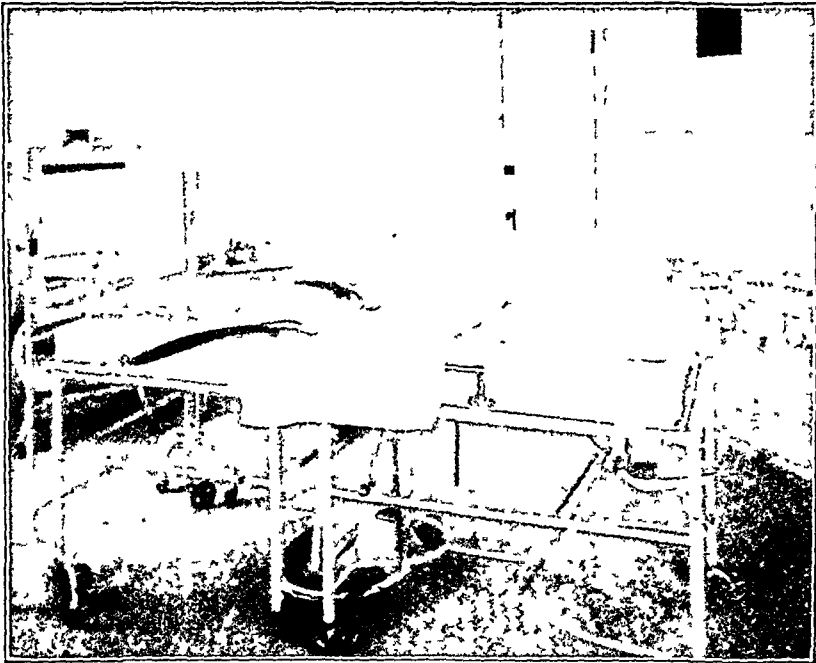


Fig. 1.

While the primary object of the mirror is to aid the anesthetist, it has been found to be of value in demonstrating deliveries to students. The students stand at the head of the table, away from the sterile area, out of sight of the patient, and obtain a perfect view of the delivery.

In several hospitals the apparatus has been improvised by hanging the mirror from the top of a one-panel screen, with a strip of muslin stretched behind the lower edge of the glass. More satisfactory, however, is the mirror with a stand.

The accompanying illustration shows the mirror as used in the National Homeopathic Hospital of Washington, D. C. Experience has shown that the view is less likely to be obstructed if the lower edge of the mirror is about eight inches higher than the level of the table.

1801 EYE STREET, N. W.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

A REVIEW OF THE GYNECOLOGIC LITERATURE OF 1925

BY SYDNEY S. SCHOCHET, M.D., CHICAGO
(Attending Gynecologist St. Bernard's Hospital)

AND

JULIUS E. LACKNER, M.D., CHICAGO

THE literature of gynecology of the past year, for the most part, consists of evaluations of the methods of treatment of carcinoma; of an extensive consideration of adenomatosis; of discussions of the time honored corrections of displacements with profusely illustrated technical descriptions; of analyses of the very little understood functions of menstruation; and of learned expositions on the relationships of the endocrine system to gynecology, or some detailed consideration of the many biochemic tests, which generally overshoot the mark as far as their real value in gynecic therapy is concerned.

In offering our critical analysis of the literature of 1925, we do so with much embarrassment, and with the fear that we have not accepted freely the results of empiric observations. And yet it is not necessary to dwell on the fact that new paths have been blazed as the result of empiric hypotheses as well as carefully detailed planned scientific investigations. It is necessary, however, to argue in favor of strict limitations as to conclusions, because conflicting theories of various investigators have led to skepticism, even to the point of doubting. This is essentially true of our knowledge concerning hormones. There seems to be current a good deal of misconception regarding specificity of hormone action in menstruation. Though we do not hesitate to discuss "hormones," only two endocrines are known chemically; namely, thyroxin and epinephrin; and there are physiologists who do not consider that epinephrin has a hormone function. Many of our modern fictions in physiology about *specific hormone action* have reechoed a widespread belief in their presence in certain pelvic organs. For ourselves, we doubt of their existence. The review in the biochemic fields makes us think of a very interesting novel, *Arrowsmith*, by Sinclair Lewis. It is time, therefore, without losing sight of the advances in biochemistry, to bestow more adequate attention on the homely everyday problems in gynecology.

GENERAL PROBLEMS

Fewer authors have written on the sedimentation test as a diagnostic aid in gynecology during the past year. Let us reflect. Although

the earlier observations on these phenomena were called to our attention by John Hunter in 1794, and in the earlier works of Galen, the last word about the many causes of precipitation of the erythrocytes has not as yet been spoken. Baer and Reis⁵ have carefully analyzed the value of this test in pregnancy and in pelvic lesions. They conclude that it is apparently of no value in the early diagnosis of pregnancy, but see it as a useful test to determine pelvic pathology, and the virulence of infections, and they consider it a more delicate prognostic index than either the leucocytic or temperature curve.

Ward¹¹ is of the opinion that the study of medicine in the future will be the study of biologic sciences, and interprets the gynecic art as more than the mere cutting and sewing of the pelvic organs. It should include sociologic studies with regard to a woman's fitness for marriage and childbearing, her sexual psychology, and her degeneracies under modern social conditions.

While it is true that some of the modern theories of electricity are of a merely speculative character, yet they serve as a working basis to explain phenomena observed in the therapeutic use of electricity. Kolischer⁵⁸ in a very interesting and highly scientific paper has elucidated some of the modern theories in the science of electricity. A careful study of this paper will prove of material aid to many roentgenologists.

Schochet⁹⁸ reports the observation of distinctly different groups represented in the blood of mother and child in a normal obstetric case. Such findings disprove one of the many theories of the etiology of eclampsia.

Endoscopy of the abdomen, described by Nadeau and Kampmeier,⁸¹ belongs to some of the novel innovations in diagnosis. While such experiments are interesting from an academic viewpoint, it is doubtful whether they should be advocated to supplant the more exact means of diagnosis or exploratory laparotomy. This instrument necessarily limits the extent of exploration within the abdomen, and does not prevent trauma or preclude the possibility of infection or adhesions.

Drainage of the thoracic duct has been advocated by McGuire⁷² in the treatment of peritonitis. It does not appear that procedures of this type are on sound bases, for numerous organisms undoubtedly enter the blood stream via the blood vessels as well as the lymphatics.

Kovacs⁶⁰ reports temporary sterility in 56.3 per cent of white rats after the injection of placental tissue. The author believes that absorption of some component of the placenta may account for the temporary sterility following abortions. Curtis²⁶ is of the opinion that focal infections with a tendency towards exacerbation are important causes of otherwise inexplicable spontaneous abortions.

Clinical results of chemotherapy are not always as favorable as reported by certain investigators. Even repeated intravenous injections of salvarsan do not necessarily rid the body of spirochetal infections. Robertson⁹¹ advocates intravenous injections of freshly prepared eusol in the treatment of severe septic states.

Tákáts¹⁰⁷ gives a very exhaustive study of the evolution of chemotherapy with brilliant results from the use of a substance called rivanol. (2 aethoxy - 6.9 diamino-acridine.)

Winter¹¹⁷ suggests that a routine bacteriologic examination should be made of the vaginal flora in all gynecologic cases. In this way a more careful prognosis can be given. It should be borne in mind, how-

ever, that the presence of organisms, even of the virulent streptococcus, does not necessarily mean an active or latent infection in the host.

Clark¹⁸ reviews the many conditions which render patients poor risks in pelvic surgery. Anesthesia in this respect does not play so important a rôle as a septic or toxic state of the patient. Unnecessary surgical intervention is today less often done on the mobile retroverted uterus, the simple lacerated cervix, and the chronically neurotic individual than formerly. However, one should not gain the impression that all fads have been replaced by sane recognized forms of treatment. Crainicianu²² still advises organotherapy for the so-called empiric hyperfunction of the ovary.

Jaschke⁵³ states that the results of psychotherapy in gynecology often are unsatisfactory, and that when wrongly practiced the method may be harmful. It is evident that no solution seems near at hand for the cure of the large number of unstable neurotic women whom the gynecologists meet in everyday routine practice.

Lynch⁶⁵ reviews 608 gynecologic cases. In 48 per cent of these, sacral and sacrolumbar backaches were present. Of these, 87 per cent were cured of backache by gynecologic operations. From these statistics it appears that in a certain percentage of cases a backache must be ascribed to gynecologic pathology.

Dickinson and Pierson³¹ bring to our attention interesting facts, not generally discussed. The average age of autoerotic practices among college women was found to be thirty-seven years with the largest group at thirty years. Two-thirds of 1183 unmarried college women seemingly practiced masturbation. Of this large series, 42 per cent began for the most part between five and eleven years of age. One-third of this group reported indulgence once or twice a month.

ANESTHETICS

For aged patients, when a general anesthetic is indicated, MacNider⁶⁷ suggests that it should be preceded by a diet rich in carbohydrates and with the judicious use of sodium bicarbonate in order to maintain a normal acid base equilibrium of the blood during the anesthetic. Mandelbaum⁶⁸ advises intraspinal anesthesia for elderly women, but favors a general anesthetic for younger patients.

VAGINA AND CERVIX

Robinson⁹² presents positive experimental evidence that potassium iodide and sodium salicylate when placed in the vagina are rapidly absorbed, and excreted in the urine.

Szenes¹⁰⁶ finds that calcium salts increase the calcium content of the genital secretions.

A positive etiologic diagnosis of vaginal cysts cannot be made from the histologic picture alone, unless the location of the cyst is considered. Miles⁷⁴ reports five cases of cyst of the vagina, of which one was an inclusion cyst of the vaginal mucosa and four were cysts of Gärtner's ducts. Wharton¹¹⁵ reviews thirty-one authentic cases of tuberculosis of the vagina, and adds two new observations from a series of 30,000 gynecologic cases in the Johns Hopkins Hospital. He concludes that the medical treatment gives the best end-results.

For the treatment of gonorrheal Bartholinitis (not abscessed) Gouin and Austin⁴⁷ inject a few drops of a 10 per cent solution of zinc chloride into the gland. We do not believe that this dangerous caustic

should be injected into the tissues, nor does it seem logical, that it is at all feasible to obtain sterilization of the gland. Gordon⁴⁶ reports a case of primary tuberculosis of Bartholin's gland. Only three other cases of this sort have been recorded.

Arnoldi and Warnekros³ emphasize an old empiric clinical observation, that patients with pruritus vulvae, whether diabetic or not, are helped by a low carbohydrate antidiabetic diet.

Sturmdorf¹⁰⁵ is opposed to the postoperative use of the indwelling catheter in cases of vesicovaginal fistulae for it does not keep the bladder empty. Watkins¹¹³ has advised a thorough dissection of the anterior vaginal wall for closure of vesicovaginal fistulae. He claims that a urethrocele is usually associated with a cystocele as the result of a transverse tear of the upper part of the vesicovaginal fascia. Successful repair requires transverse suture at the site of the injury and care in bringing firm tissue over the base of the urethra. In large vesicovaginal fistulae in which the capacity of the bladder is reduced, Miller⁷⁶ advises high colpoceleisis with supravaginal amputation of the uterus or radium sterilization. Prolapse of the culdesac of Douglas or posterior vaginal enterocele has received little attention in the literature. It is a causative factor in the prolapse of the uterus of virgins and is often overlooked. In the more severe cases, Phaneuf⁸⁹ suggests the abdominal route for repair.

Barrett, Lash, and Pilot⁶ found streptococci present in 40 per cent of the cases of chronic infection of the cervix. Lowenstein⁶⁴ points out that *Oxyuris vermicularis* is often overlooked in the etiology of leucorrhea. He emphasizes the importance of a thorough general physical examination in the study of every case of leucorrhea, since it is not an uncommon experience to find marked leucorrhea in patients with systemic conditions, such as tuberculosis, asthenia, and chlorosis.

Hilliard Miller,⁷⁶ Carl Davis,²⁹ and Abrams¹ recommend the cautery method of treatment in endocervicitis. Blair,⁸ and Burns¹² advocate Sturmdorf's coning-out procedure for it eradicates the mucosa but conserves the cervix. Miller does not favor radium in the treatment of endocervicitis because it is slower in action, more expensive, and may cause the onset of artificial menopause. It should also be borne in mind that radiation destroys certain defensive protective bodies. Lavake⁶² reports his experience with diathermy in the treatment of endocervicitis and controls the effect of treatment by means of cervical smears. He tried the Corbus metal electrode in the cervix but was unable to discharge a single patient as cured of the infection after three months of active treatment. Young¹¹⁹ drains the cervical glands by means of intermittent aspiratory hyperemia. Jaschke,⁵² and Menge⁷³ emphasize the importance of genital hypersecretion as caused by extragenital disturbances. A purely symptomatic treatment of the fluor often does more harm than good. Castellani and Taylor¹⁶ report cases of vaginitis due to *Monilias*. These cases are frequently encountered in the Balkans, Italy, and England.

ADENOMATOSIS

Sampson's interpretation of certain cysts and adenomyomas in the pelvic organs as caused by misplaced endometrial tissue has provoked world-wide interest. This is the outstanding topic in the literature of 1925. Heaney,⁴⁹ Danforth,²⁸ Mark,⁶⁹ Lemon and Mahle⁶³ report cases of adenomas in the operative scar. Outerbridge⁸⁷ records

four cases of cystic lesions, possibly of endometrial origin, in the appendix. Sampson⁹⁵ believes that benign endometrial tissue invades and disseminates through the same channels as carcinoma. Benign endometrial tissue, just as ovarian and endometrial carcinoma, is found most often in the dependent portions of the pelvis and its natural peritoneal folds, with invasion of underlying structures. Benign endometrial tissue, like fragments of cancer, infects the field of operation. Both invade lymph vessels. Both have metastases at a distance from the primary growth. Inguinal adenometriosis⁹⁶ metastasizes through lymph vessels, extends directly along the round ligaments from peritoneal endometriosis and from endometrial tissue, escaping into uterine vessels during menstruation. Ewing,³⁴ in discussing Sampson's findings, accepts as endometrial transplants those cases in which the structure is typical, in some instances even those without endometrial stroma, especially when the clinical history indicates that some violence has been done to the endometrium or tubal mucosa which can reasonably account for a transplant or misplacement of endometrial mucosa. The clinical history is of much importance in these cases in guiding the surgeon and the pathologist in assuming that they deal with an endometrial transplant. The changes occurring in these tissues during menstruation and pregnancy appear to be unreliable evidence of their endometrial origin, but have some significance. The fact that endometrial tissue can be transplanted by mechanical means should be a warning to the gynecologist. Ewing is convinced that a large proportion of fatalities from cervical and corpus carcinoma is the result of cell dissemination produced by the surgeon. Cullen,²⁴ therefore, advises closure of the cervix and cleansing of the vagina to prevent escape of carcinoma cells during hysterectomy for corpus carcinoma. He believes that adenomyomas of the umbilicus and round ligaments are embryonic inclusions while adenomyomas of abdominal scars are transplants.

Robinson⁹² maintains that the theory of displacement no longer fills our present conception of heterotopic endometrial formations and, therefore, should be discarded. Adenomyoma is peculiar to the female and is prevalent during the period of maximal procreative function. Robinson believes that the celomic epithelium is the genetic source of all adenomyomas irrespective of location.

Oskar Frankl⁴¹ favors operative removal of adenomyomas, since x-rays and radium do not prove sufficient. In those cases where there is extensive involvement of the intestine by endometrial invasion, Sampson advises against any radical operative procedures, for in the majority of cases the endometrium undergoes retrogression.

MYOMA

Clark and Block¹⁷ advise no interference in those cases of fibroids in which there is no obvious disturbance of health. In the absence of well-defined indications for the removal of the cervix, subtotal hysterectomy is the operation of choice. At the present time myomectomy carries no higher mortality than hysterectomy and is followed by pregnancy in a certain percentage of cases. Clark and Block¹⁷ report 422 cases of uterine myomas. Their statistics show that operative treatment is becoming more popular and radiation less frequently employed. In 1922, 58.1 per cent were operated. In 1924, 70.1 per cent. Graves⁴⁸ emphasizes the value of myomectomy in the childbear-

ing period. Bonney⁹ urges a more extensive adoption of the operation of myomectomy so as to include in its scope many of the cases showing fibroids, still commonly dealt with by hysterectomy. Conservation of the uterus should be the ideal of the surgeon, whenever the organ is presumably healthy. The largest number of fibroids enucleated by Bonney at one time was sixty. The removal of so large a number of fibroids appears to us as ultraconservative. In operative cases of fibroids complicating pregnancy, one can preserve the pregnancy when the fibroid is solitary. Not long ago, large tumors and hemorrhagic uteri were removed radically with and without the removal of the adnexa. Zweifel and Veit believe that in benign conditions of the uterus, a small portion of the uterus containing endometrium should be retained. Bergsman believes that to keep uterine menstruating mucosa is just as important as to retain the internal secretory functions of the ovary.

Aschner⁴ says, if one believes that not only the internal secretions but also a normal menstrual flow are necessary for the health of women up to the time of the normal menopause, then x-rays can be discarded. In every woman where there is no vital indication for extirpation of the uterus, menstruation should be allowed to continue until the climacteric. Partial fundus resection is the best treatment. In later years there may be a recurrence of fibroids, but the clinical results obtained by continuation of menstruation overshadow the danger of the recurrence. Masson,⁷⁰ and Foucar³⁷ believe that the application of zinc chloride to the endometrium is indicated in a small percentage of cases that pass through the menopause with abnormal bleeding, not due to malignancy. This treatment produces amenorrhea and sterility, without impairment of ovarian function. Here again we question the use of zinc chloride in gynecology. It has been shown experimentally that zinc chloride is a very toxic substance when accidentally injected into the circulatory system. Its local action cannot be controlled, and it frequently destroys the deep underlying structures. Seed¹⁰⁰ reports degeneration in 13 per cent of 200 fibromyomas examined. Hyalin, myxomatous, and red degeneration, with calcification were present. Starry¹⁰⁴ reports a rare case of fatty tumor of the uterus. Only seventeen cases of lipoma and lipomyoma are recorded in the literature.

METRRORRHAGIA

In a certain percentage of metrorrhagias, according to Castano,¹⁵ hemorrhagic reactions in the endometrium are due to hormonal influences from the corpus luteum. At the present time there is no unified treatment of uterine bleeding. In the climacteric patient, Henkel⁵¹ believes, every case of bleeding should be regarded as cancer and a diagnostic curettage made, except in cases where the diagnosis of cancer is evident. Mazet⁷¹ advises digital exploration of the interior of the uterus in order to determine the cause of a climacteric hemorrhage. Pregnancy and adnexal inflammation constitute the only contraindications to intrauterine digital exploration. Kelly⁵⁵ advocates curettage in the office without anesthesia, for it is safe, speedy, and inexpensive. Gellhorn emphasizes the importance of curetting each cornu of the uterus for carcinoma and polyps, which are often situated in this location. He decries the use of intrauterine douches and antiseptics, which may cause hematometra and pyometra. The essentials in curettage are gentleness in dilatation and handling of instruments.

Rubin³³ emphasizes the value of the hysteroscope in diagnosing uterine causes of genital bleeding, such as submucous myoma, glandular hyperplasia, endometrial polyps, chorioepithelioma, and malignancy. The instrument may also be of value in studying the cyclic changes of the endometrium in the various stages of menstruation. We believe that too great an evaluation is placed on the uteroscope.

In the treatment of hemorrhages caused by chronic inflammation, Fuss⁴³ reports success with local methods. Morrow employs radium or hysterectomy in the therapy of arteriosclerosis of the uterus. Newcomer controls hemorrhage due to general systemic conditions or to local benign growths by mild roentgen irradiation. Doub, Bolliger, and Hartman³² report irradiation sickness in a large percentage of their cases. Symptoms were alleviated by morphine and calcium lactate. Radiation therapy should be undertaken only by those who have a competent surgical knowledge, as Graves⁴⁸ emphasizes that there are certain contraindications to radiation which require the experience of a specialist for diagnosis. These are pelvic infections, retention of follicular cysts of the ovary, sloughing fibroids, submucous myomas and carcinoma of the fundus.

MALIGNANCIES

The cancer problem is the most pressing as well as the most difficult that occupies the minds of the medical world at the present time. While cancer still exercises its ravages almost uncurbed, we yet cling to the faith, that future research will reveal some means of its eradication or prevention. So long as we possess no exact clue in regard to the true nature of malignancy, we should not permit ourselves to be enslaved by arbitrary definitions, statistics, and theories of causation, or be hampered by brilliant reports of methods of therapy. The problems of cancerous growth are fundamentally identical with the problems of normal growth of tissue, and the information which sheds light upon the one type of growth will reveal the origin of the other. Cancer statistics are notoriously open to various interpretations. A lay statistician, a pathologist, or physician untrained in methods of exact statistics may draw conclusions that appear absurd. What value can be placed on such divergent reports on cancer mortality rate as 64.4 for Detroit and 152.6 for San Francisco?

Ochsner⁸⁵ considers cancer an infection and emphasizes the importance of Nuzum's infective agent, a micrococcus, as the causative factor. Coley¹⁹ believes that there are clinical evidences in favor of the extrinsic origin of cancer.

Nuzum⁸¹ gives the results of six years bacteriologic study of breast tumors and claims to have reproduced similar lesions in the dog with repeated injections of his micrococcus.

According to an editorial in the *Journal of the American Medical Association*, the British Cancer Research¹²¹ decries the many exalted newspaper claims of discovery of the etiologic factors of cancer. Soper,¹⁰³ Director of the American Society for the Control of Cancer, deplors the claims of Nuzum. Nuzum's paper is straightforward, but unfortunately contains statements and interpretations, conjectures and opinions which carry his conclusions even farther than he intended. In fairness to Nuzum, we may state that he does not claim that cancer in human beings is caused by a bacterium. Such inferences initiate a great hidden danger of an increased deathrate from cancer, since

some physicians and many laymen might conclude that we now possess a serum or salve that cures cancer. MacCarty⁶⁶ believes that the cancer cell is an entity and he recognizes this cell in the majority of cases when fresh material is employed. This may be possible for MacCarty, but it would be dangerous practice for the average pathologist. Frankl⁴² reports eight cases of carcinoma and sarcoma simultaneously present in the uterus. He suggests that both growths originate at the same time, but it is difficult to demonstrate this. Unfortunately we are still so deeply ignorant of many important aspects of malignancy that it becomes difficult to properly evaluate the various methods of treatment. Reports and clinical observations on radium and x-ray treatment are now more numerous than in previous years. While it is true that every case of carcinoma is a study unto itself, yet much additional value could be added to these reports if a uniform classification, such as that suggested by Schmitz,⁹⁷ were followed.

Ward and Farrar¹¹² have adopted Schmitz's classification in regard to the stages of involvement, and conclude that radium application is the better procedure. The end-results are as good as with operations while the patient does not incur the risks of surgical intervention.

Smith¹⁰² advocates radium and x-ray therapy together with the Byrne cautery for early carcinoma. Pfahler⁸⁸ entertains the view that radiation offers the best chance in all stages of carcinoma. He states that we may expect 60 to 80 per cent of cures in the earliest stages. Unfortunately the majority of gynecologists have failed to obtain such brilliant results. Quigley⁹⁰ reports 69 cases treated by radiotherapy with apparent cures in 37 cases. Burnam and Neill¹¹ apply radium through the abdominal route in borderline cases of uterine cancer, and they believe this to be a more effective means of attack. Taussig¹⁰⁸ now employs 3000 to 3300 mg/hr. in the first treatment and four weeks later applies a second dose of from 1500 to 1800 mg/hr.

Schmitz⁹⁷ reports good end-results in inoperable carcinoma with measured doses of x-rays and radium. Graves¹⁸ emphasizes the contraindication of radium in cases of carcinoma of the body of the uterus. From Döderlein's Clinic, Voltz reports the results in 755 patients treated with radium: 110 were operable cases, with 43.6 per cent cures; 130 were borderline cases with 22 per cent cures; 340 were inoperable cases with 6.7 per cent cures; 169 were hopeless cases with one cure.

References to the operative results of uterine cancer are not given, for we believe that it is the method of choice to be employed in properly selected cases.

RELATION OF BREASTS TO GENITAL ORGANS

C. Jeff Miller⁷⁵ refers to the close relationship between the breasts and genital organs. He believes that certain pathologic breast changes, cystic mastitis, etc., may be caused by pathology in the pelvis. Exploratory incision is necessary in a large majority of cases. Mohler⁷⁸ reports considerable improvement in the treatment of obstinate pelvic infections with hypodermic injections of foreign proteins.

DYSMENORRHEA

Novak⁸³ considers dysmenorrhea a neurosis, which has its roots in a previous psychic trauma. Dick³⁰ believes that many cases of dysmenorrhea are relieved by psychotherapeutic measures. Castano¹⁵ refers to a close relationship of dysmenorrhea and appendicitis. In 90

per cent of his cases of dysmenorrhea there was an associated chronic appendicitis. Miller⁷⁵ thinks that dilatation with curettage is still the commonest form of treatment and gives the largest percentage of temporary and permanent relief. In his series Miller obtained permanent relief in 40 per cent of the cases. Plastic operations on the cervix are of little value. Lanz finds that menstruation does not influence basal metabolism in healthy women, but in pathologic conditions, there is a definite rate of increase in the premenstrual period and in the last days of menstruation. At the beginning of the menses the metabolism decreases quickly and reaches its lowest rate at the beginning of the flow. Blood-sugar determinations made by Okey and Robb⁸⁶ during menstruation showed a slightly higher value than those made in the intermenstrual period. Smit¹⁰¹ says diathermy may be useful in all conditions benefited by heat; viz., dysmenorrhea, sterility due to uterine hypoplasia, and secondary sterility caused by superinvolution of the uterus.

Cotte,²⁰ and Dechaume tried decortication of the hypogastric artery with section of the presacral nerves in the treatment of rebellious dysmenorrhea, pelvic neuralgia, vaginismus, hypoplasia of the uterus of mild infective origin, clitoris crisis, metrorrhagia, and leucorrhea of ovarian origin in young girls. At the present time they resect the presacral nerves, where they pass through the peritoneum along the inner side of the last lumbar vertebra. It seems to us that too many conditions are attributed to these nerves.

STERILITY

Kennedy⁵⁷ believes that isthmospasm of the fallopian tube prevents the meeting of the ovum and the sperm, or may be the only obstruction that prevents the passage of the fertilized ovum from the tube into the uterus. Polak (in discussion of Kennedy's paper) brings out a point that seems to support such a spasmodic condition of the tubes; namely, that the Rubin test may be negative until the patient is anesthetized, when the injected gas easily passes through the tubes.

Geist and Goldberger⁴⁴ emphasize the importance of pathologic conditions in the intramural portion of the tube for sterility. Lesions may be present here with or without closure of the fimbriated extremity. With the Rubin test alone, one cannot localize the site of obstruction in the tube. Geist advises for this purpose the use of Kennedy's test, before operative measures are instituted. Vercesi¹¹⁰ employs a 40 per cent suspension of iodine in vegetable oil to procure roentgenogram tracks. Williams and Reynolds¹¹⁶ insufflate an emulsion of barium sulphate into the uterine cervix and makes roentgenograms twenty-four, forty-eight, and seventy-two hours later. The emulsion is dropped into the uterine cavity and not forced in under pressure. In the course of seventy-two hours all barium has disappeared.

Kahn⁵⁴ emphasizes the importance of pathologic conditions in the cervix in the study of sterility cases, and he believes that lesions here, more frequent than changes in the tubes, are the cause of sterility. Cervical secretions constantly blocking the canal indicate a hyperemic or inflamed condition of the cervical glands. Cervical discharge may be altered chemically by disturbances in ovarian function. Kahn advises against curettage in the treatment of primary sterility, since it frequently causes lacerations of the cervix and endometritis. Rubin⁶⁷

states that the fourth to the seventh day following the cessation of the menses is the ideal time for testing the patency of the tubes.

Moench⁷⁷ believes that insufflation of the tubes has a small but real therapeutic value in cases of sterility, but lays greater stress on the important rôle of cervical conditions.

In cases of infantile uteri with sterility, Castano¹⁴ advises the use of diathermy. One of twenty patients thus treated became pregnant. In cases of hypofunction from infantile development, Flatau³⁶ has resorted to the stimulation of the ovaries with small doses of roentgen irradiation. He cites 21 cases of which 12 became pregnant; 8 of these carried to full term and were delivered of healthy children. Waser^{112a} reports but one failure in 225 sterilizing interventions with the Madlener crushing method of the tube followed by ligation.

EXTRAUTERINE PREGNANCY

In a study of the leucocyte count in 150 cases of ectopic gestation, Farrar³⁵ finds that the leucocyte count increased rapidly with the escape of blood into the peritoneal cavity, but dropped quickly to normal or near the normal as the blood was absorbed or walled off by peritoneal adhesions. The fluctuating leucocytic count and the moderate elevation of temperature differentiates ectopic gestation from purulent salpingitis, as in the latter conditions, there is a more uniformly high leucocyte count and a more marked fluctuating temperature curve. When there is a hemorrhage in a tubal pregnancy case, the steadily rising leucocyte count is a better aid in diagnosis than the decrease in red blood cells or the percentage of hemoglobin. The leucocytic count to be of diagnostic value must be taken daily or hourly in critical cases. In 21 cases of tubal pregnancy Novak and Darner⁸² were able to correlate the uterine and tubal mucosal findings. The decidual reactions in the uterus with extrauterine pregnancy were identical with that of normal gestation as long as the embryo was alive. When the embryo dies, the superficial compact part, and a considerable portion of the spongy glandular layer is cast off. The decidua is more frequently thrown off in small particles than as a large uterine cast. This is on account of degenerative and necrotic changes.

OVARY

It is difficult to estimate the true value of the various researches on ovarian function, as too few of the fundamental physiologic processes of this organ are known at the present time.

During the past year extensive investigations of the liquor folliculi have been recorded. Schochet⁹⁹ was the first to call attention to the physiologic action of the liquor folliculi in ovulation. Allen, Pratt, and Doisy² attribute a hormone action to the liquor, and have devised a means for the standardization of its action.

Robert Frank concludes that the corpus luteum, placenta, and follicle fluid contain the female sex hormone. Frank, Gustavson, Weyerts, and Frank⁴⁰ have shown that a benzene extract of circulating blood of pregnant sows produces vaginal changes in castrated rats. In another series of experiments, Frank, Kingery, and Gustavson³⁸ prove that the female sex hormone is the causative factor of puberty.

Frank and Gustavson³⁹ in a study of the chemistry of the female sex hormone conclude that it is a thermostabile lipoid of high molecular weight; that it is elaborated by the gestational gland, and is taken up

by the lymph and blood streams. Allen and Doisy² have shown that substances obtained from the placenta and embryonic tissue (umbilical cord) produce reactions in the rat similar to those produced by the follicular hormone. From these experimental studies it would seem logical to question the specificity of hormone action in the liquor folliculi.

Burrows and Johnston,¹³ in experiments on fat metabolism found that the liquor folliculi contains an active growth-stimulating substance, and one capable of initiating an active digestion of a foreign fat. Brouha and Simonnet¹⁰ observed that an injection of an extract of liquor folliculi prolonged the estrous cycle, but produced no changes in the mammary gland, nor were there apparent influences on gestation. Temporary inhibition of ovulation in the rabbit was obtained by Kennedy with extracts of corpus luteum. In 28 cases studied by Cotte and Vachey,²¹ they were unable to prove that the corpus luteum produces metrorrhagia and menorrhagia. They ascribe a greater importance to the sympathetic nervous system as the etiologic factor. Watrin¹¹⁴ reports the production of menstruation in a girl with defective menstruation by the injection of follicular fluid. The menstrual flow appeared the following day—six days before the anticipated period. Gynecologists find that menstruation frequently follows surgical procedures about the ovaries. We may suggest that accidental rupture of follicles are responsible for the flow of blood in these postoperative cases.

Tuffier and Bour¹⁰⁹ report successful results from ovarian grafts in 52 cases; in some cases the menstrual flow persisted for periods varying from five to ten years. In other cases, the ovarian grafts were followed by pregnancy with normal childbirth. Kross⁹¹ advocates ovarian grafts in patients with congenitally absent ovaries, and in cases of bilateral castration in young women on account of pus tubes.

Blair Bell⁷ reports 187 cases of ovarian grafting with an analysis of 118. Of these, menstruation occurred in 66.3 per cent. No menstruation and no menopausal symptoms were observed in 20 per cent; menopausal symptoms in 14 per cent. From these reports it seems warranted that ovarian grafting should play a more important part in future reconstructive gynecic surgery.

During the past year Sampson^{95, 96} has called attention to the important part played by endometrial transplants. The frequency of glandular elements, similar in structure and physiologic function, cannot be denied. However, before we can accept these structures as endometrial transplants, arising from the endometrium of the uterus or mucosa of the tubes, we must require more definite experimental data. While we entertain a less skeptical frame of mind as to the possibility of endometrial transplants, we cannot lose sight of their possible origin from peritoneal metaplasia. Aside from this academic discussion of the origin of endometrial transplants, Sampson⁹¹ has convincingly proved that a certain percentage of carcinomas of the ovary take their origin from these endometrial glandular areas.

Dougal²³ reports a case of primary chorioepithelioma of the ovary. This group of tumors is of considerable importance as they occur in unmarried women. Often erroneous and embarrassing conclusions are given as to their source of origin.

Koucky⁵⁹ states that 50 per cent of dermoids of the ovary may be diagnosed by the x-ray. Gordon⁴² describes an unusual case of cystic

retroperitoneal teratoma weighing 11 kilograms. Danforth²⁷ reports the finding of an unusually large bilocular pseudomucinous cyst in a patient fifteen years of age. Curtis,²⁵ Danforth,²⁷ and Schochet⁹⁹ have recorded cases of fibroma of the ovary. This type of tumor is not of frequent occurrence. Culbertson²³ describes a case of follicular ovarian cyst simulating ectopic pregnancy. This type of ovarian growth is of great clinical importance because we cannot be positive of a pre-operative diagnosis. Actinomyces is among the rare infections of the ovary reported by Helwig.⁵⁰

Many valuable and suggestive papers in this year's literature on the treatment of carcinoma with radium will be considered at a later date in a special review.

REFERENCES

- 1 Jour. Am. Med. Assn., 1925, lxxxv, 418.
- 2 Jour. Am. Med. Assn., 1925, lxxxv, 399.
- 3 München. med. Wehnschr., 1925, lxxii, 807.
- 4 Arch. f. Gynäk., 1925, cxxiv, 113.
- 5 AM. JOUR. OF OBST. AND GYNEC., 1925, x, 397.
- 6 AM. JOUR. OF OBST. AND GYNEC., 1925, ix, 797.
- 7 Surg., Gynec. and Obst., 1925, xli, 706.
- 8 Surg., Gynec. and Obst., 1925, xl, 473.
- 9 Jour. Obst. and Gynec. Brit. Emp., 1925, xxxii, 200.
- 10 Compt. rend. Soc. de Biol., 1925, xcii, 553.
- 11 Radiology, 1925, v, 1.
- 12 Lancet, London, 1925, ii, 806.
- 13 Jour. Exper. Med., 1925, xlii, 215.
- 14 Gynec. et Obstét., 1925, xi, 207.
- 15 Prensa Medica Argentina, Buenos Aires, 1925, xi, 869.
- 16 Jour. Obst. and Gynec. Brit. Emp., 1925, xxxii, 69.
- 17 AM. JOUR. OBST. AND GYNEC., 1925, x, 560.
- 18 Jour. Am. Med. Assn., 1925, lxxxiv, 881.
- 19 Surg. Gynec. and Obst., 1925, xl, 353.
- 20 Presse méd., 1925, xxxiii, 98.
- 21 Rev. franc. de gynéc. et d'obstet., 1925, xx, 18.
- 22 Presse méd., 1925, xxxiii, 117.
- 23 Surg., Gynec. and Obst., 1925, xli, 120.
- 24 AM. JOUR. OBST. AND GYNEC., 1925, x, 732.
- 25 Surg., Gynec. and Obst., 1925, xl, 296.
- 26 Jour. Am. Med. Assn., 1925, lxxxiv, 1262.
- 27 Surg., Gynec. and Obst., 1925, xl, 585.
- 28 AM. JOUR. OBST. AND GYNEC., 1925, x, 630.
- 29 Surg., Gynec. and Obst., 1925, xl, 568.
- 30 Arch. f. Gynäk., 1925, cxxiv, 345.
- 31 Jour. Am. Med. Assn., 1925, lxxxv, 1113.
- 32 Am. Jour. Roentgenol., 1925, xiii, 54.
- 33 Jour. Obst. and Gynec. Brit. Emp., 1925, xxxi, 387.
- 34 AM. JOUR. OBST. AND GYNEC., 1925, x, 730.
- 35 AM. JOUR. OBST. AND GYNEC., 1925, x, 205.
- 36 Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 401.
- 37 AM. JOUR. OBST. AND GYNEC., 1925, x, 355.
- 38 Jour. Am. Med. Assn., 1925, lxxxv, 1558.
- 39 Jour. Am. Med. Assn., 1925, lxxxiv, 1715.
- 40 Jour. Am. Med. Assn., 1925, lxxxv, 510.
- 41 AM. JOUR. OBST. AND GYNEC., 1925, x, 680.
- 42 AM. JOUR. OBST. AND GYNEC., 1925, ix, 745.
- 43 Zentralbl. f. Gynäk., 1925, xlix, 404.
- 44 Surg., Gynec. and Obst., 1925, xli, 646.
- 45 Jour. Am. Med. Assn., 1925, lxxxiv, 1822.
- 46 Surg., Gynec. and Obst., 1925, li, 399.
- 47 Ann. d. mal. vén., 1925, xix, 823.
- 48 AM. JOUR. OBST. AND GYNEC., 1925, ix, 445.
- 49 AM. JOUR. OBST. AND GYNEC., 1925, x, 625.
- 50 Surg. Gynec. and Obst., 1925, xl, 502.

- 51Deutsch. med. Wehnschr., 1925, li, 507.
- 52Arch. f. Gynäk., 1925, cxxv, 224.
- 53Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 388.
- 54AM. JOUR. OBST. AND GYNEC., 1925, x, 254.
- 55AM. JOUR. OBST. AND GYNEC., 1925, ix, 78.
- 56Jour. Am. Med. Assn., 1925, lxxxv, 13.
- 57Quart. Jour. Exper. Physiol., 1925, xv, 103.
- 58Surg., Gynec. and Obst., 1925, xl, 271.
- 59Ann. Surg., 1925, lxxxi, 821.
- 60AM. JOUR. OBST. AND GYNEC., 1925, x, 232.
- 61AM. JOUR. OBST. AND GYNEC., 1925, ix, 628.
- 62Surg., Gynec. and Obst., 1925, xli, 31.
- 63Arch. Surg., 1925, x, 150.
- 64Monatschr. f. Geburtsh. u. Gynäk., 1925, lxviii, 199.
- 65Calif. and West. Med., 1925, xxiii, 801.
- 66Surg., Gynec. and Obst., 1925, xli, 783.
- 67Surg., Gynec. and Obst., 1925, xl, 493.
- 68Zentralbl. f. Gynäk., 1925, xlix, 1023.
- 69Med. Klinik, 1925, xxi, 744.
- 70AM. JOUR. OBST. AND GYNEC., 1925, x, 355.
- 71Rev. franç. de gynéc. et d'obstet., 1925, xx, 82.
- 72Surg., Gynec. and Obst., 1925, xl, 626.
- 73Arch. f. Gynäk., 1925, cxxv, 251.
- 74Surg., Gynec. and Obst., 1925, xl, 381.
- 75AM. JOUR. OBST. AND GYNEC., 1925, x, 375.
- 76AM. JOUR. OBST. AND GYNEC., 1925, ix, 73.
- 77Jour. Am. Med. Assn., 1925, lxxxiv, 1802.
- 78AM. JOUR. OBST. AND GYNEC., 1925, ix, 365.
- 79Marseille méd., 1925, lxii, 1450.
- 80Casop. lék. česk., Praze., 1925, lxiv, 1357.
- 81Surg., Gynec. and Obst., 1925, xli, 259.
- 82AM. JOUR. OBST. AND GYNEC., 1925, ix, 295.
- 83München. med. Wehnschr., 1925, lxxii, 599.
- 84Surg., Gynec. and Obst., 1925, xl, 343.
- 85Surg., Gynec. and Obst., 1925, xl, 336.
- 86Jour. Biol. Chem., lxv, 165.
- 87AM. JOUR. OBST. AND GYNEC., 1925, x, 545.
- 88Surg., Gynec. and Obst., 1925, xli, 443.
- 89AM. JOUR. OBST. AND GYNEC., 1925, ix, 507.
- 90Radiology, 1925, v, 9.
- 91Surg., Gynec. and Obst., 1925, xl, 218.
- 92Jour. Obst. and Gynec. Brit. Emp., 1925, xxxii, 433.
- 93AM. JOUR. OBST. AND GYNEC., 1925, x, 313.
- 94Arch. Surg., 1925, x, 1.
- 95AM. JOUR. OBST. AND GYNEC., 1925, x, 649.
- 96AM. JOUR. OBST. AND GYNEC., 1925, x, 462.
- 97AM. JOUR. OBST. AND GYNEC., 1925, ix, 644.
- 98Surg., Gynec. and Obst., 1925, xl, 122.
- 99Proc. Am. Assn., of Anatomists, Yale University, 1915, p. 71.
- 100Surg., Gynec. and Obst., 1925, xli, 333.
- 101Nederl. Maandschr. v. Geneesk., 1925, xiii, 1.
- 102Surg., Gynec. and Obst., 1925, xl, 598.
- 103Surg., Gynec. and Obst., 1925, xl, 334.
- 104Surg., Gynec. and Obst., 1925, xli, 642.
- 105Surg., Gynec. and Obst., 1925, xli, 358.
- 106Wien. klin. Wehnschr., 1925, xxxviii, 601.
- 107Surg., Gynec. and Obst., 1925, xli, 79.
- 108Radiology, 1925, v, 5.
- 109Presse méd., 1925, xxxiii, 1073.
- 110Pathologica, 1925, xvii, 421.
- 111Ohio State Med. Jour., 1925, xxi, 481.
- 112Jour. Am. Med. Assn., 1925, lxxxv, 159.
- 112aZentralbl. f. Gynäk., 1925, xlix, 2321.
- 113Surg., Gynec. and Obst., 1925, xl, 274.
- 114Compt. rend. Soc. de biol., 1925, xcli, 772.

- 115 *Jour. Am. Med. Assn.*, 1925, lxxxv, 237.
 116 *Brit. Med. Jour.*, 1925, i, 691.
 117 *Zentralbl. f. Gynäk.*, 1925, xlix, 1.
 118 *Deutsch. med. Wchnschr.*, 1925, li, 19.
 119 *New York State Jour. Med.*, 1925, xxv, 49.
 120 *Editorial, Jour. Am. Med. Assn.*, 1925, lxxxv, 1730.
 121 *Editorial, Jour. Am. Med. Assn.*, 1925, lxxxv, (July 13).

Selected Abstracts

Abortion

Eymer, H.: *The Value of the Life of the Unborn in Obstetrics.* Wiener Klinische Wochenschrift, 1924, xxxvii, 946.

The author decries the laxity with which the indications for therapeutic abortion often are set. He agrees that the life of the mother is always of more value than that of the unborn but does not believe that the life of the fetus should be destroyed on account of minor ailments, such as is too readily done at the present time. He does not believe that pyelitis, struma, tumors, etc., are indications for the termination of pregnancy and he objects to the modern tendency to consider pregnancy as a complication of these various diseases. Pregnancy does not affect most diseases of the blood. In acute splenic leucemia, abortion does no good, and in the chronic form it is unnecessary. In Biermer's anemia, abortion does not help, for the patient cannot be saved in any event, and by allowing pregnancy to go on a living child may result. In diabetes mellitus abortion is not necessary since the disease may be fatal or go on to recovery whether the patient is pregnant or not. Prophylactic abortion should not be done in this disease unless acidosis is present.

Heart disease is only rarely of importance though frequently present. Jaschke found a mortality of only 1 per cent in valvular disease complicating pregnancy. Mitral stenosis, alone or in combination with other lesions, is dangerous, especially during the second stage of labor. An attempt must be made to maintain cardiac compensation, and therapeutic abortion should be performed only as a last resort in cardiac decompensation. Recurrent endocarditis and myocarditis are also of serious import, but even here the attempt should be made to carry the patient to term.

Renal disease is often observed in pregnancy but a pure nephropathy never requires an abortion which should be done only for rising blood pressure or when albuminuric retinitis threatens maternal vision. Abortion never improves or renders an otosclerosis stationary.

Basedow's disease may be a grave complication of pregnancy, but interruption of the latter is not necessarily followed by improvement. Epilepsy is not relieved by a therapeutic abortion, and the author was unable to influence in any way a case of status epilepticus in which he terminated pregnancy. Myelitis, multiple sclerosis, multiple neuritis, chorea, and tetany only rarely require abortion and then only in the most severe forms.

The author states that he has never seen a case of hyperemesis gravidarum requiring abortion. In acute yellow atrophy, abortion is usually done too late to be of any value. In tuberculosis, therapeutic abortion has no curative effect but is merely a prophylactic procedure. The patient continues with her tuberculosis irrespective of her pregnancy which usually does not influence the disease one way or another. Patients in the first stage of tuberculosis are made no worse by the pregnancy and never die on account of the latter. Great uncertainty prevails with

patients in the second stage of tuberculosis as to the value of therapeutic abortion and literature shows great discord regarding the termination of pregnancy; artificial abortion in cases in the third stage of tuberculosis is of no avail since these patients will die whether pregnancy continues or not.

Tumors of the abdomen, pelvic or otherwise, justify abortion only when malignant. A contracted pelvis should never be accepted as an indication. Surgical method of delivery should be employed here as well as in cases where there is a threatened rupture of the uterus, and also in cases of placenta previa.

There are no foundations for any eugenic indications, and the author agrees with Stratz that the only eugenic indication for terminating pregnancy is hydrocephalus.

RALPH A. REIS.

Van Dongen: Threatened Abortion. *Nederlandsch Tijdschrift voor Genceskunde*, 1923, ii, 1927.

Bleeding from the uterine cavity during pregnancy does not necessarily mean threatened abortion but is a danger signal not to be disregarded. With the greatest caution, an examination should be made to determine: the presence or absence of pregnancy, intra- or extrauterine, the patency of the cervix, and the presence or absence of protruding parts of the ovum. Here the author cautions not to be too hasty in considering an abortion inevitable simply because the cervix admits the finger. He also calls attention to the necessity of excluding other sources of bleeding; e.g., cervical polyp, cancer, or erosion. Tumors, varices, and traumatism of vagina and vulva may also cause bleeding during pregnancy.

While the severity and duration of the bleeding influence the prognosis, yet van Dongen feels that one should not give up hope too readily, since pregnancy may continue after severe and very prolonged bleeding. To quiet uterine contractions, he gives 20 mg. of opium, four times a day. He has never seen any benefit from viburnum and similar drugs and has discontinued their use long ago. Vaginal tampons are contraindicated as they may excite uterine contractions. It is better to resort to enemata than cathartics to evacuate the bowels.

R. E. WOBUS.

Ogasawara, Kiyoshi: Experimental Studies of Intrauterine Death of Fetus. *Kinki Fujinkwa Gakkwai Zassi*, 1925, viii, No. 1, 15.

The careful histologic studies both of the fetus and of the placenta after administration of x-rays, and after the injection into the mother animal of various bacterial toxins and different chemicals, showed that only marked alterations in the chorionic tissue, necrosis, and hemorrhages are associated with fetal death. No ill effect of any of these procedures on the fetus itself could be ascertained in the absence of such placental lesions. Thus, the author seems justified in concluding that a primary death of the fetus in utero apparently is impossible.

AUTHOR'S ABSTRACT.

Karlin, M.: The Retention of Dead Fetuses in the Uterine Cavity. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1924, lxxvii, 270.

The author cites three cases of missed labor, the etiology of which was atresia of the cervix, rigidity of the cervix, and carcinoma of the cervix respectively. Eight cases of missed abortion are also described. In the latter cases, after the death of the fetus, the blood vessels in the villi collapsed and the fetal membranes were nourished by the blood in the intervillous space and the blood in the decidua vessels. In four of the cases there was a marked fibrous transformation of the stroma of the villi which aroused the suspicion of syphilis although the histories were entirely negative. The degree of necrosis of the membranes did not

depend as much upon the duration of their retention after fetal death as it did upon the cause of fetal death.

For cases of missed abortion most authors advise active therapy. In infected cases great care must be exercised to avoid trauma. For missed labor, if the membranes are intact and there are no local or general symptoms, a policy of expectancy should be followed unless there is a hindrance to spontaneous dilatation of the cervix. If after two weeks of waiting and the use of drugs, labor does not set in, pregnancy should be terminated artificially. When the membranes are ruptured and the temperature is normal, vaginal cesarean section or a metretomy may be employed. In infected cases some authors advise hysterectomy after delivery.

J. P. GREENHILL.

Umbach, J.: Intrauterine Fetal Degeneration. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1925, lxxviii, 283.

The author studied seven embryos for evidence of degeneration, and found that the processes involved in the intrauterine degeneration of these fetuses are the same as those observed in autolysis outside the body. The degenerative changes found are not due to "wandering cells" as many authors believe. Some claim these wandering cells are maternal, while others maintain they are fetal in origin. Umbach claims that these wandering cells are simply dead cells produced by autolysis of embryonic organ cells and that they have no function at all. The differences in the histologic picture between anemic infarcts and degenerative embryos are essentially due to the fact that dead embryos are entirely removed from contact with maternal blood.

J. P. GREENHILL.

Kehrer: Proposal for a Standard of Operative Technic in Abortions and Premature Labors. *Zentralblatt für Gynäkologie*, 1923, xlvii, 1163.

Following a discussion at the gynecologic meeting in Dresden, Kehrer has collected a number of points upon which agreement was practically universal, and proposes their adoption as a standard in the termination of pregnancy in the early months.

The two grave dangers are hemorrhage and infection, and the major necessity is the complete removal of the products of conception. As influencing these conditions he advocates antiseptic as well as aseptic care prior to operation, and in the earlier months digital exploration of the uterus. To allow the passage of the finger a tight cervical pack followed by emmenagogues may be sufficient, but in any case the operation is best performed in two stages, the pack being used, if necessary, after moderate dilatation. The great danger is perforation of the uterus. It may be a result of inexperience rather than the use of any particular instrument, but stress is laid on the importance of recognition of the condition, and the immediate necessity for operative care. The difficulty of sterilization renders the use of tents doubtful, and dilatation with Hegar's dilators is often imperfect. It may, however, be complemented either by a pack, the introduction of several tents at the same time, or a small dilating bag.

As the pregnancy progresses the importance of the fetal head as a factor in termination increases, and the separation of the head from the trunk is one of the gravest dangers in association with operations after the tenth week. After emptying the uterus, intrauterine douche is generally unnecessary but may stimulate contraction, lessen bleeding, and lessen the bacterial content of the cavity. Heat and a large quantity of fluid are the essentials, and toxic substances should not be used.

Packing is unnecessary as it favors infection, but in certain instances, as after the removal of a mole or where there is doubt as to the complete emptying of the cavity, a pack may be used for twelve hours.

The later in pregnancy the necessity for interruption arises, the more important is the rubber balloon. Perforation of the aftercoming head may lessen the necessity for complete dilatation of the cervix, and the manual removal of the placenta is discouraged except in cases of extreme necessity. LITTLE.

V. Franqué, O.: Basic Principles in the Technic of Cleaning Out Abortions. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1925, lxi, 320.

The author reports two cases where rupture of the uterus occurred while attempts were being made in the first half of pregnancy to clean out the uterus before the cervix was sufficiently dilated. One of these patients died. On the basis of these cases and much experience v. Franqué lays down the following rules: (1) Before every attempt to empty a uterus after an abortion, the cervix must be dilated sufficiently to admit a finger. In all cases it is advisable to give a narcotic and examine the uterus digitally. (2) A purely instrumental emptying of the uterus is permissible only until the ninth week and only with a large dull curette. (3) Later, a purely instrumental operation is in error. The uterus must be explored with the finger, the secundines separated from the uterine wall and removed with the finger. The curette should be used only to remove portions which have been separated and the small pieces which remain after digital manipulation. (4) Ovum forceps should be used only to remove loosened pieces of tissue which are visible and palpable just inside the internal os. Deeper in the uterine cavity forceps should be inserted only alongside the index finger which constantly controls what the forceps are to grasp and remove. If the cervical canal is too tight for this, oxytocics should be given until there is sufficient dilatation. (5) After the third month it is best to leave the expulsion of an ovum to uterine pains or at least until the cervix is sufficiently dilated to enable easy removal. Until this occurs the uterus should be packed with iodoform gauze. In later months a small bag may be used or a Braxton-Hicks version performed. J. P. GREENHILL.

Wulff, H.: False Perforation of the Uterus—Relaxation of the Uterus. *Acta Gynecologica Scandinavica*, 1923, ii, 449.

Perforation of the uterus may sometimes be pardonable but never the failure to recognize a perforation. However, there are times when it is difficult to be sure that a perforation has occurred. Wulff reports the case of a patient whom he curetted for an incomplete abortion. At first the curette indicated the length of the uterine cavity to be 14 or 15 cm., but suddenly without encountering any resistance the curette went to a depth of 23 cm. The uterus was extremely soft and could not be definitely outlined bimanually. A perforation of the uterus was suspected and a vaginal hysterotomy performed, but no perforation could be found. The uterus contracted well after removal of the secundines. This was a case of uterine relaxation and not one of perforation.

In the literature five cases have been reported where perforation was suspected but operation failed to show any injury. The author warns against the use of the uterine sound in cases like the one reported. Likewise a sharp curette should not be employed. In cases where the uterus is very soft an effort should be made to produce contractions before curetting. If the uterus cannot be made to contract, digital removal of tissue is the means to be employed. If the cervix cannot be dilated sufficiently to permit the passage of a finger, vaginal hysterotomy followed by digital manipulations is the method of choice. If a perforation is feared one should treat the patient as if the uterus actually was perforated. If the uterine contents are presumably sterile and there is no bleeding and no suspicion of injury to the abdominal organs, one should be conservative. J. P. GREENHILL.

Heyn: Perforations of the Uterus and Their Treatment. *Zeitschrift für Geburtshilfe und Gynäkologie*, 1924, lxxxvii, 92.

The author draws conclusions from a series of 35 cases. There has been a marked increase in the number of this accident since the war, not only due to the increase in the number of abortions in general, but also as a result of inadequate practical training for young physicians. Four perforations were in nonpregnant uteri, in two associated with a fresh salpingitis. One of these died, the other recovered after total extirpation of the uterus. The other two recovered after simple suture. Of the 12 operated cases of perforation of the pregnant uterus, nine were done by physicians,—only two in criminal abortions. The author believes from the nature and location of the wounds that a great many more than are reported are caused by the Hegar dilators, but that the perforation is not recognized until some other instrument, such as the curette or ovum forceps, is introduced.

Conservative suture of the perforation, even of the pregnant uterus, may in many cases be undertaken without increasing the risk to the patient and thus preserving the genital organs, since in the presence of infection, the opening up of large raw areas for extirpation is in itself a dangerous procedure. The question of liability to uterine rupture in a future pregnancy could only be answered after observation of large series of cases. The question of drainage through the culdesac or extraperitoneally must be decided in the individual case. Very important, especially where injury has been done by grasping instruments, is the systematic search for injury to the bowel. Also important is a search for free pieces of fetus or placenta in the peritoneal cavity, which may easily lead to a fatal peritonitis. All cases of perforation, or even only suspected perforation, should immediately be referred to a gynecologist, since a delay even of hours may be fatal. Prophylaxis is most important. Particular care should be taken in teaching students how to handle such cases and the dangers involved in the use of various instruments.

MARGARET SCHULZE.

Gotting, Fritz: A Contribution to the Management of Abortions. *Klinische Wochenschrift*, 1922, I, 2480.

The policy of immediate cleaning out of the uterus in treating afebrile incomplete abortions is thoroughly established. The same is true as regards abstention from local interference in cases of complicated febrile abortions, especially when periuterine inflammation is present.

As regards the handling of uncomplicated febrile abortions, there exists great diversity of opinion. Many authorities consider that the determination of the infecting organism by bacteriologic study is of the greatest importance. It is agreed that the streptococcus is the most dangerous, and a conservative policy is advised by most authorities when it is found, especially if it is of the hemolytic variety, since the mortality in patients infected with this organism is 10 to 15 per cent. In Frank's clinic such bacteriologic studies have not yielded definite results of prognostic value, except that in cases of hemolytic streptococcus infection the prognosis appears to be worse. But it is not hopeless even when these organisms are found in the blood.

The author is in favor of more active measures for the following reasons: (1) Cleaning out the uterus is often necessary on account of free bleeding; (2) the infected, adherent placenta may be the source of a continuous bacterial invasion of the maternal blood stream; (3) time is saved both for the hospital and for the patient.

The results have been thoroughly satisfactory. Of the 1268 cases of abortion reviewed in this paper 650 (51.3 per cent) were febrile. This percentage has steadily increased since the war years (in 1913 it was 42 per cent), doubtless due to an increase in the number of criminal abortions as a consequence of the eco-

nomie depression. Of these cases, in 44 the uterus was emptied by the physician before admission, in 137 cases, which were conservatively handled on account of some complication, the uterus emptied itself spontaneously, and in 1087 patients the uterus was cleaned out in the hospital. There were 66 deaths (5.2 per cent), and complications after the cleaning out were recorded in 66 patients (5.2 per cent). Of the 66 deaths, only 25 had had local treatment in the hospital (a mortality of 2.3 per cent to the credit of active therapy); 23 of the 41 others had periuterine inflammation, 8 had had the uterus cleaned out before admission, 5 were very septic (some of these were moribund on admission), 3 had severe peritonitis, 1 had a lung abscess, and 1 had pulmonary tuberculosis. The febrile abortions showed a gross mortality of 10.1 per cent; the cases of this group in which the uterus was cleaned out in the hospital had a mortality rate of 3.8 per cent.

The evacuation of the uterus is gently done under narcosis, after dilatation of the cervix sufficiently to admit the finger. If this cannot be done, a laminaria tent is employed, but not for more than twelve hours, because of the danger from retention. When the cervix is open, the ovular remnants are loosened with the finger, removed with Winter's placental forceps, then a large blunt curette is used if necessary to remove fragments not detached by the finger, and finally a hot intra-uterine douche of salt solution is given. If the uterus is flabby, an ergot preparation is given hypodermatically. Packing is performed only when necessitated by free bleeding. In one case the uterus was perforated by the curette; supravaginal hysterectomy was at once performed, with recovery.

In impending abortion with complications, conservative and supportive measures are employed.

The author remarks incidentally that lues played a minor part in the etiology of these abortions; of 475 Wassermann tests on these patients, it was positive in only 20, or 4.2 per cent.

E. L. KING.

Tuttle, Howard K.: *The Treatment of Abortions.* Surgery, Gynecology and Obstetrics, 1925, xl, 87.

The writer reviews 1,164 cases of abortion at the Ancon Hospital, Canal Zone, to compare his results with those of other clinics. His references are, however, limited to two writers of Chicago and one personal communication.

He is of the opinion that hemorrhage sufficiently severe to call for immediate active treatment is seen in approximately 5 per cent of all cases. Febrile cases operated upon promptly have a slightly higher average number of postoperative febrile days, a lower per cent of morbidity, and fewer average hospital days than those operated upon a number of days after the temperature has remained normal. The average febrile days, morbidity percentage, and average hospital days of operative cases are lower than in the nonoperative. Those cases where infection has extended beyond the uterus, and without evidence of retained necrotic placenta or membranes, should be treated expectantly. When tissue remains in the uterus it is just as essential to remove it as a sloughing appendix in the abdomen.

WM. C. HENSKE.

Gordon: *The Management of Abortion.* Journal American Medical Association, 1924, lxxxii, 1021.

A series of 961 consecutive cases of abortion was divided into septic and aseptic. Septic cases are those with temperatures of 101° F. by rectum. In a further classification of a total of 1,640 abortions into threatened, inevitable, and incomplete, there were 1528 incomplete abortions. The management of the threatened case consists in preparation as though for labor. No intravaginal cleansing, bedrest, morphine, $\frac{1}{2}$ grain hypodermically—repeated two or three times, and daily enemas. If the case passes to the inevitable stage, and bleeding is excessive, by

means of vaginal packing or stick-sponge the removal of the products of gestation from the dilated cervix is attempted. Sixty-two per cent were packed; 10 per cent required repacking. Pituitary extract, 0.5 c.c. is given every three or four hours. If the case passes to the incomplete type, expectant treatment is carried out unless profuse hemorrhage warrants curettage. Three per cent were curetted. All the septic cases were treated without intrauterine manipulation. These cases were kept outdoors, in Fowler's position. Forced feeding, blood transfusion, vaccines, serums, foreign protein, etc., were relied upon.

W. KERWIN.

Dietrich: Collective Statistics on the Treatment of Febrile Abortion. *Archiv fuer Gynaekologie*, 1923, cxx, 14.

The author collects ten thousand cases reported from twenty clinics. The mortality was 4.8 per cent after active treatment which included some conservative methods and 3.1 per cent after entirely expectant treatment. The mortality after curettage was 3.4 per cent; if palpation was used it rose to 4.4 per cent, and after digital emptying of the uterus it was 5.9 per cent.

RALPH A. REIS.

Pelkonen: On the Treatment of Febrile Abortions. *Finska läkaresällskapets handlingar*, 1924, lxvi, 570.

The number of febrile abortions managed in the Wiborg District Hospital is varying but persistently increasing since 1919. The author thinks that poor housing and financial distress force an ever increasing number of women to seek hospital care, but that also criminal abortions have become decidedly more numerous. From 1898 to 1923 a total of 1766 abortion cases had been treated; of them 1,174 were admitted between 1914 and 1923, among them 378 being febrile patients. Of this last group, 330 were treated actively, the remaining 48 cases conservatively. Mortality in the actively treated was 2.1 per cent, but zero in those conservatively managed. In determining the indications for appropriate therapy, the hospital followed rather closely the rules laid down by Halban (*Zentralbl. f. Gynaek.*, 1921, p. 439). If careful palpation fails to show any involvement of adjoining structures, the uterus, in case of fever is evacuated. Often it is advisable to wait a few days, for the temperature may become normal in the meantime. In cases in which it seems likely that adjoining structures are involved in the infectious process, the patient is treated conservatively on principle. Interference then is considered justified only by severe hemorrhage in spite of possible harm from the operation.

AUTHOR'S ABSTRACT.

Grabich, F.: Active or Conservative Treatment of Septic Abortion. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1923, lxiv, 308.

In the Dortmund Clinic among 554 cases of febrile abortion there was a mortality of 0.7 per cent for those treated actively, 1.6 per cent for those treated conservatively, and 1.3 per cent for those treated expectantly. Grabich reports 100 additional cases of septic abortion treated actively. In 76 cases the temperature fell markedly within twenty-four hours after emptying the uterus. Bacterial studies which were made in nearly all the cases were of little value. The patient's resistance alone is of importance in overcoming the infection.

Of greater importance than the bacteriology is the question of how to empty the uterus. The means to be considered are the ovum forceps, the curettage and the finger. The method of emptying the uterus must be as harmless as possible, and to accomplish this best, the author recommends the broad, dull curette. Digital removal of tissue maltreats the uterus and may force infected material through the tubes into the peritoneal cavity. Antiseptic douches are not to be used. After emptying the uterus the patient should be given stimulative therapy.

J. P. GREENHILL.

Ten Berge: *The Treatment of Abortion and Puerpural Sepsis*. *Nederlandsch Tijdschrift voor Geneeskunde*, 1925, ii, 798.

In the light of current opinion on the treatment of abortion, Ten Berge reviews his own experience, citing illustrative cases. He sums up the subject as follows: by the timely removal of *all* ovular remnants, the occurrence or extension of infection may often be avoided. In order to avoid causing wounds through which the infection may spread, the removal should be carefully done manually. Whenever the infection is still limited to the uterine wall, the patient usually recovers quickly after the emptying of the uterus. In case of periuterine infection, the genitalia should be manipulated as little as possible. Should bleeding compel intervention in such cases, the uterus should be emptied with the greatest of gentleness. All patients in whom the infection has extended beyond the uterus, should be removed to a hospital in order to receive the utmost care.

Ten Berge has used electrargol, as well as the polyvalent serum and quinine injections proposed by Gordon Luker, but has not been able to see any favorable results ascribable to their use.

R. E. WOBUS.

Henrard, E.: *Quinine Therapy in Febrile Abortions*. *Monatsschrift für Geburtshilfe und Gynaekologie*, 1923, lxiii, 19.

In all stages of febrile abortions, quinine therapy is indicated. Two c.c. of a 25 per cent solution of quinine hydrochloride should be given both intravenously and intramuscularly and in addition two one-quarter grain tablets of quinine hydrochloride should be given by mouth. In 88 per cent of the author's cases of febrile abortions in progress, and in 52 per cent of his febrile cases where the placenta was retained, the uterus was emptied by means of this treatment. In the cases where small pieces of placental tissue remained in the uterus the quinine proved unsuccessful in emptying it. However, in the latter cases the quinine produced a softening and dilatation of the cervix, making instrumental dilatation unnecessary. Manual removal of the placenta was very easily accomplished in the latter patients. The author emphasizes that one must carefully watch the patients for profuse hemorrhage after the use of quinine.

J. P. GREENHILL.

Hellendall: *Supravaginal Amputation of the Uterus in Severe Postabortive Bleeding, for the Purpose of Hemostasis and Sterilization*. *Zentralblatt für Gynäkologie*, 1924, xlviii, 324.

The incidence of severe hemorrhage as the result of abortion, particularly in those cases where some constitutional disorder is present, has suggested the importance of the suprapubic hysterotomy and sterilization, which has been undertaken frequently by many operators. Hellendall would go a step further and in these cases remove the body of the uterus, believing that the blood loss is considerably less, that the convalescence is more rapid, and that the tendency to postoperative complication is also decreased.

LITTLE.

Heim: *Two Cases of Physometra*. *Zeitschrift für Geburtshilfe und Gynäkologie*, 1924, lxxvii, 156.

The author describes, in considerable detail, two cases of gas bacillus infection of the uterus following early abortion.

MARGARET SCHULZE.

Special Article

ON THESES BY UNDERGRADUATE STUDENTS OF MEDICINE

THE curriculum of American medical schools has been subjected to extended revision in the last two decades and the necessity for including many laboratory and theoretical subjects has reduced the time devoted to the clinical and bedside teaching. Among other things the "thesis" formerly much in vogue as a requirement for graduation, has been largely abandoned, although it cannot be denied that it had an undoubted value in stimulating an independence of thought and brought the student into more intimate contact with the problems of medicine, while it provided a relief from the possible tedium of textbook study, laboratory exercises and didactic lectures.

The Editor of the Journal takes pleasure in presenting to his readers extracts from a series of theses contributed by students of the Cornell University Medical School during their fourth year of attendance, as a part of their work in the department of gynecology carried out in the wards and record rooms of the Woman's Hospital under the guidance and supervision of Dr. Geo. Gray Ward, Chief Surgeon of the latter and Professor of Gynecology and Obstetrics at Cornell Medical School. Both the titles and the subject matter are of interest. Lack of space forbids the complete publication of these valuable contributions, of which selections follow, but they may be found complete in the *Surgical Report of the Woman's Hospital*, for 1925.

—G. W. K.

POSTOPERATIVE LEUCOCYTOSIS

A STUDY OF THIRTY CASES FROM THE WARDS OF THE WOMAN'S HOSPITAL OF NEW YORK¹

BY MARGARET S. WITTER, A.B., M.D., NEW YORK, AND
WILLIAM P. ELLIOTT, A.B., M.D.

(Fourth Year Students, Cornell University Medical College)

THERE often arise, during the course of a case, occasions when the leucocyte count is desired as an aid in the diagnosis and prognosis of postoperative events. In order critically to interpret such a postoperative count, it is necessary to have some judgment as to the average normal count after operation, and as to the limits which may be considered normal and beyond which one should be suspicious of untoward events.

¹The First Polk Prize in Gynecology was awarded to Dr. Witter for this thesis.

If we are to accord the leucocyte count high rank, we must perfect our judgment of the normal leucocyte values. Therefore, it seemed to us that a study of a number of average, "clean" cases with uneventful recoveries would afford some basis for such a judgment of the normal postoperative leucocyte curve. It is the purpose of this article to present a study of 39 such cases from the wards of the Woman's Hospital in the State of New York, done under what we consider to be practically standard conditions. That is:

1. The cases were entirely from the service of Dr. George Gray Ward. They had no complicating events throughout their entire postoperative course, and were of the type considered as average, "clean" cases.

2. The preoperative preparation, the anesthesia, the operative procedures, the immediate and later postoperative care, all conformed to standard technic.

3. The counts used as data in Series I were done by an experienced technician, doing all routine counts in the hospital and using consistent technic.

SERIES I

Thirty cases were studied. A preoperative count was taken some time during a 1 to 3 day preoperative interval. We assumed that, under non-varying conditions, an uninfected case should have a fairly constant count preoperatively; and we found this to be true in several cases in which daily preoperative counts were done for a week. Therefore, these counts have been charted as "pre-op," irrespective of the exact day.

Beginning with the first postoperative day, counts were then done daily for 5 to 8 days.

OBSERVATIONS

Table I shows the minimum, maximum, and average total leucocyte counts for each day, with number of cases counted.

TABLE I
TOTAL LEUCOCYTE COUNTS

DAY OF COUNT	NUMBER OF CASES	MINIMUM	MAXIMUM	AVERAGE
Pre op.	30	6000	13000	9000
1	21	12000	26000	18000
2	21	10000	27000	16000
3	28	9000	21000	13000
4	25	6000	21000	11000
5	23	7000	19000	10000
6	23	8000	19000	12000
7	18	7000	21000	13000

Table II shows the minimum, maximum, and average percentage of polynuclears for each day, with the number of cases.

TABLE II
PERCENTAGE OF POLYNUCLEARS

DAY OF COUNT	NUMBER OF CASES	MINIMUM	MAXIMUM	AVERAGE
Pre-op.	30	42	80	66
1	20	73	94	82
2	26	75	93	82
3	28	73	93	79
4	24	64	87	76
5	24	58	74	70
6	17	70	84	75
7	21	62	83	75

Table III shows the minimum, maximum, and average temperatures for each day, with the number of cases.

TABLE III
TEMPERATURES (DEGREES FAHRENHEIT)

DAY OF COUNT	NUMBER OF CASES	MINIMUM	MAXIMUM	AVERAGE
Pre-op.	30	98.0	99.8	98.6
1	22	98.8	104.0	100.8
2	25	98.0	102.8	100.4
3	28	98.4	100.8	99.6
4	25	98.4	100.8	99.6
5	26	98.6	100.8	99.4
6	22	98.6	100.6	99.0
7	23	98.4	100.6	99.0

DISCUSSION

From Figure 1,* we can see that there is a leucocyte curve which is highest on the first day after operation, at 18,000. It then steadily declines to normal on the fifth day (10,000), and then rises slightly on the sixth and seventh days.

The cause of this secondary rise has not been determined, or its duration. It has been suggested that the absorption of suture material at this period may be the etiologic factor.

The leucocytosis would seem to be mainly a polynucleosis. The preoperative differentials show a low percentage of polynuclears,—average 66 per cent—Table II. The operation is followed by a rise and the curve remains at its height for two days and descends a bit more slowly than the total leucocyte curve.

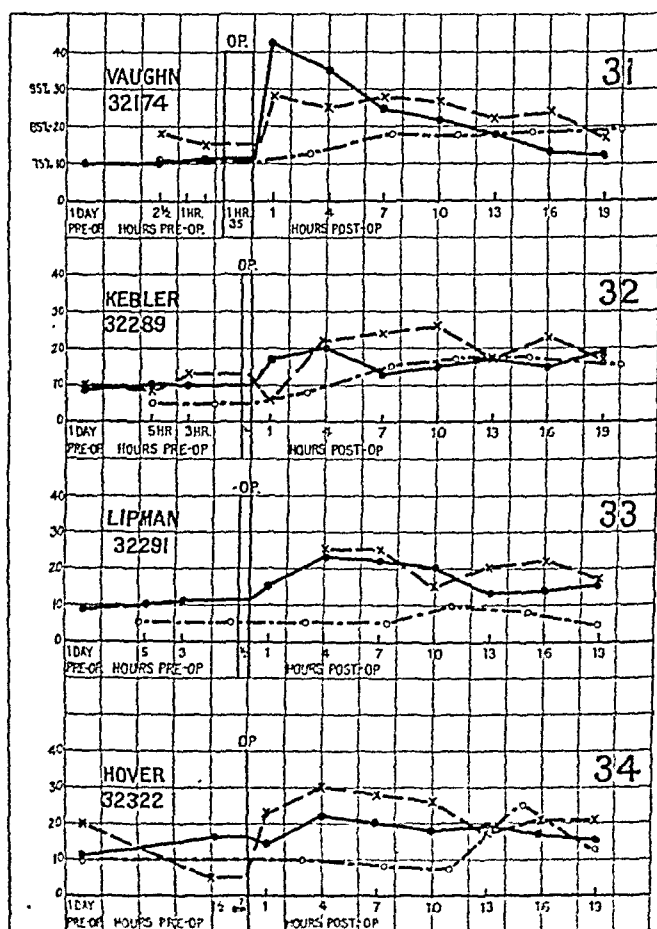
The temperature curve, likewise, Figure 3,* shows its peak on the first day and descends slowly to high normal—99.0—on the sixth day. The figure showing the average temperature curve would lead one to believe that the leucocytes and temperature bear a constant, direct relationship. but the individual charts appended show that the relationship is not so close.

*See original article, *Surgical Report of the Woman's Hospital*, 1925.

Having seen from Series I that there was a fairly constant postoperative leucocyte curve during the first week, we were interested to know when the peak of the leucocytosis occurred. From Figure 1,* one would infer that the peak was one day after operation. In order to investigate this, nine cases were studied in detail.

SERIES II

Blood counts were done on the day preceding operation, and at 11:30 A.M., and 1:30 P.M., of the day of operation. The operation occurred from 2:30 to 4:30 P.M. A count was then done one hour after operation and every three hours thereafter during the night. During this period,



Charts 31-34. Series of hourly postoperative blood counts. Total leucocyte count ———; per cent polynuclears — — — —; temperature degrees Fahrenheit

Fig. 31. The operation performed consisted in a panhysterectomy, salpingo-oophorectomy bilateral, separation of adhesions, appendectomy. The time consumed was 1 hour, 35 minutes.

Fig. 32. The operation consisted in a Kelly stitch (for incontinence) and perincorrhaphy. The time consumed was 35 minutes.

Fig. 33. Operation: Kelly for retroversion. Time: 34 minutes.

Fig. 34. Operation: dilatation and curettage. Time: 7 minutes.

*See original article, *Surgical Report of the Woman's Hospital, 1925.*

the patients were kept in the recovery room. The same methods were used as in Series I. Temperatures were taken every four hours, routinely, by the nurse.

OBSERVATIONS

Charts 31 to 39 inclusive show the results, charted in hours after operation, while charts 31A, 32A, 33A, show the curves as charted according to scale used in Series I.

The percentage of polynuclears varied in general with the leucocytosis, rising to a peak, in the majority of cases, around the fourth hour, and in all cases the peak was reached by the tenth hour.

There is, however, no close association between total leucocytes and percentage of polynuclears.

The temperature, as may be observed from the charts, does not rise synchronously with the leucocytes. In no case was the peak reached before the seventh hour after operation.

CONCLUSIONS

1. There is a leucocytosis following operation which reaches its height by the fourth hour after operation, and returns to normal by the fifth day.

2. We are led to believe that the height of the peak varies directly with the duration of operation, and extent of associated trauma produced, other factors being negligible.

3. The leucocytosis seems to be mainly a polynucleosis, the average of which compares grossly with the average total leucocyte count.

4. The temperature does not rise synchronously with the leucocytes but reaches its height several hours later. The average curve then remains grossly parallel with the leucocyte curve, but inasmuch as the temperature and leucocyte curves are not parallel in individual cases, one cannot assume that a certain temperature is constantly associated with a certain leucocytosis.

5. A further study of a larger series is necessary to correlate the various factors involved in this leucocytosis.

THE INCIDENCE AND END-RESULTS OF CARCINOMA OF THE OVARY AT THE WOMAN'S HOSPITAL

BY CHARLES S. BYRON, A.B., M.D., AND HARRY S. BERKOFF, A.B., M.D.

IN the period between Jan. 1, 1908, and January 8, 1923, 87 cases of carcinoma of the ovary were recorded at the Woman's Hospital. This study will be limited to 82 of those cases, the remaining 5 lacking either operative or pathologic confirmation of such a condition. During that same period 29,844 cases were admitted to the

Gynecological Service of the hospital, giving an incidence of 0.27 per cent for carcinoma of the ovary (Table I). There were also recorded 535 carcinoma of the cervix and 296 carcinoma of the body of the uterus, incidences of 1.8 per cent and 0.99 per cent respectively, placing carcinoma of the ovary as the least common of the more frequent genital neoplasms. Of the 2517 ovarian cystomata treated during that time, the 82 carcinomata form rather a small proportion—3.15 per cent, while the 53 cystic carcinomata in the series form a proportion of 2.1 per cent. The apparent increase in the number of cases of carcinoma of the ovary in recent years is only in keeping with the greater registration of the hospital and does not indicate a greater frequency of occurrence.

TABLE I

GENERAL INCIDENCE OF CARCINOMA OF THE OVARY
Between Jan. 1, 1907, and Jan. 1, 1923

	NO. OF CASES	PER CENT
Total number of admissions	29844	
Carcinoma of ovary	82	0.27
Carcinoma of cervix	535	1.8
Carcinoma of body of uterus	296	0.99
Relation of Carcinoma of the Ovary to Ovarian Cystomata		
Number of ovarian cystomata	2517	
Carcinoma of the ovary	82	3.15
Cystic carcinoma of the ovary	53	2.1

TABLE II

AGE INCIDENCE OF CARCINOMA OF THE OVARY
Total Number of Cases 81

AGE	CASES	PER CENT
10-19	1	1.23
20-29	7	8.61
30-39	17	20.96
40-49	20	24.6
50-59	28	34.57
60-69	8	9.84

Youngest 19 years; Oldest 68; Average 45.9.

TABLE III

INCIDENCE OF FAMILY HISTORY OF MALIGNANCY
Total Number of Cases 54

	CASES	PER CENT
Positive	9	16.66
Negative	44	81.5
Possible	1	1.85

A perusal of Table II will reveal a distribution of occurrence of carcinoma of the ovary over six decades, 59 per cent of the total cases falling in the fifth and sixth decades. The greatest incidence lies in the fifteen year period between the ages of forty-five and

sixty—53 per cent. A large proportion, approximately 31 per cent, however, occurred below the age of forty, outside the so-called cancer age.

Out of 54 patients in whose records a definite family history was present, nine were positive for malignancy, a proportion of 16.6 per cent. The percentage stated above is high enough to be of significance, and bears out further the hereditary aspect of carcinoma.

TABLE IV
SOCIAL STATUS OF PATIENTS WITH CARCINOMA OF OVARY
Total Number of Cases 82

	CASES	PER CENT
Ward patients	41	50
Private patients	41	50

Fifty per cent of the patients in this series (Table IV) were private patients, which perhaps indicates a greater occurrence among the better classes. Not too much import, however, should be attached to this condition.

TABLE V
A. MARITAL STATUS OF PATIENTS WITH CARCINOMA OF OVARY
Total Number of Cases 81

	CASES	PER CENT
Single	19	23.4
Married	53	65.4
Widowed	9	11.1

B. OBSTETRICAL HISTORY IN MARRIED WOMEN WITH CARCINOMA OF THE OVARY
Total Number of Cases 44

	CASES	PER CENT
With full-term children	29	66
Never pregnant	10	22.7
Miscarriages only	5	11.3

C. INCIDENCE OF WOMEN WHO WERE NEVER PREGNANT
Total Number of Cases 54

	CASES	PER CENT
Married	10	18.5
Single	10	18.5
Total	20	37

Twenty-three per cent of the patients in this series (Table V) were single, a significant proportion. One of the married women, aged, twenty-seven, had been married only one month when she came under observation. She had, however, had symptoms and signs of a pelvic condition several months previous to marriage and might perhaps be included in the single group. Of the 44 married women in Part B of this table, 10, or 22.7 per cent had never been pregnant

and 5, or 11.3 per cent had been pregnant but had never given birth to a full-term child. In Part C of Table V, 20 women (single and married) in a series of 54 cases, a proportion of 37 per cent, had never been pregnant. These statistics may be taken to suggest some ovarian dysfunction, some anatomic anomaly which later became carcinomatous, and which prevented proper functioning. This may be true especially in the light of the fact that in only one case was there found, on examination, aside from the ovarian condition, a cause for sterility. That one was a case of antelexion. On the other hand, the above statistics may indicate a greater susceptibility to carcinoma of the ovary, in women who have never been pregnant.

TABLE VI

INCIDENCE OF MENOPAUSE IN WOMEN WITH CARCINOMA OF THE OVARY
Total Number of Cases 54

	CASES	PER CENT
Menopause present	26	48.2
Menopause absent	28	51.8

Most Common Period For Occurrence of Menopause from 45 to 51 years—65.3 per cent.

Earliest—40 years; latest—56 years; average—48.8 years.

Menopause not yet Reached—Youngest age—19 years; oldest age—55 years; average age 36.3 years.

Forty-eight per cent of the patients in a series of 54 were past the menopause (Table VI). The average age at which the climacteric occurred was 48.8 years, the youngest at forty, and the oldest at fifty-six. There is not much significance in these figures, the menopause being evidently neither delayed nor occurring prematurely. The period of greatest incidence was that between forty-five and fifty-one years, quite within normal limits. Any relation that the menopause may bear to carcinoma of the ovary, is only the relation which the period, in which it commonly falls, bears to carcinoma in general.

Ten patients, as shown in Table VII had had previous operations.

TABLE VII

INCIDENCE OF PREVIOUS OPERATION IN WOMEN WITH CARCINOMA OF THE OVARY

PREVIOUS OPERATION

Operation for intestinal ulcer.
Dilatation and curettage.
Dilatation and curettage and trachelorrhaphy.
Dilatation and curettage and insertion of stem pessary.
Removal of ovarian teratoma.
Removal of fibroid of uterus and appendectomy.
Operation for laceration of pelvic floor.
Repair of cervix and perineum.
Operation for hernia (2 cases).
Trachelorrhaphy.

TABLE VIII
DURATION OF SYMPTOMS

TOTAL NUMBER OF CASES 56	
Shortest	1 month
Longest	48 months
Average	10 months

The average duration of symptoms in 56 cases, as noted in Table VIII, was ten months. The longest forty-eight months, and the shortest one month. One of these patients had had an abdominal mass for ten years, but her active symptoms had been present for only three months. At operation a cystic carcinomatous mass was found in one ovary, while the other ovary had a benign cystoma attached to it. This latter was probably the tumor previously present. A duration of ten years has therefore not been ascribed to this case.

By far the most frequent group of carcinoma reported was the papillary serocystic type, carcinoma ovarii serosum. This type was present in 52 per cent of the cases. Four of these exhibited calcific deposits. Next in frequency was the glandular and solid carcinoma, the adenocarcinoma of some, and almost as frequently the pseudomucinous cystic type was found. But five cases of the primary medullary carcinoma were reported. In every type the bilateral form occurred much more frequently than the unilateral form; in the primary medullary type not one unilateral growth appeared.

Only four specimens were definitely reported as being secondary, a percentage of 5.3. In none of the other cases was there any definite evidence found of a primary focus, either at operation or after gross and histologic examination of the growth. Of the four, two had metastasized from adenocarcinoma of the body of the uterus. The remaining two were of the Krukenberg type, in one of which a definite infiltration of the cardiac end of the stomach was found. The other was the case previously mentioned, in which an operation for ulcer of the intestine was performed.

Metastases at operation (Table XII)* were found in 50 per cent of the cases in the series of 78. The most frequent distribution was to peritoneum, next the omentum, the uterus, broad ligaments and tubes. Less commonly, the other abdominal viscera were involved. The liver was involved in 5 cases and the lymph nodes in only 3. A general carcinomatosis and skin involvement was present in but 1 case. The entire abdomen was infiltrated in 2 cases out of the 39.

The average duration of symptoms in 21 cases which showed metastases at operation in a series of 35 was 11.2 months, while for the remaining 14 cases without metastases, the average was only 4.9

*This and other tables omitted here for lack of space.

months, indicating that the longer the duration of symptoms the more probable is the presence of metastases and that most cases of carcinoma of the ovary of 11 months' or more duration would probably have metastases somewhere.

According to age incidence, metastases were most frequent in the seventh decade and least frequent in the fifth. The greatest number of cases with metastases occurred in the sixth decade, 17, or 60 per cent. The smallest percentage of metastases occurred in the fifth decade.

The pathology which most frequently gave metastases was the pseudomucinous type, 61.5 per cent of which were found to have infiltrated other organs. The least frequent to metastasize was the serous type.

As stated at the beginning of this article, a poor follow-up system in the earlier days has greatly reduced the number of cases available for study. I was able to completely trace but 53 patients in any series. Of these, 16 had died from the effects of operation, from causes listed in Table XIII, A. Since this number represents the number of deaths in 79 operations, an operative mortality of 20.3 per cent is derived, a high mortality for any operation. This is a fair indication of the generally weakened state of patients with carcinoma of the ovary. Of the remaining 37 cases, 25 are dead while 12 are still alive. Among the living, the average length of life is 46.2 months, the longest having lived nine years, the shortest six months. Among the dead, the average length of life was 14.9 months, the longest three years, the shortest one month.

END-RESULTS

Most of the deaths occurred in the first year after operation. Of the 25 patients who died, 16 or 64 per cent died in the first year. In all, of the 53 patients operated upon, 32 or 60.3 per cent were dead at the end of one year, and 36 or 68 per cent at the end of two years. Only one of these patients reached the third year.

The duration of symptoms appears to have had little effect upon the end-results. In both the living and dead the average duration was approximately the same.

Despite the fact that the radical operations, the supravaginal hysterectomy and the panhysterectomy with bilateral salpingo-oophorectomy have the greatest operative mortality, the proportional number of patients living after each is higher than after any of the more conservative procedures. It is surprising to note also that the operative mortality is relatively greater following the supravaginal hysterectomy than it is following the panhysterectomy. The average duration of life in the living cases is longest after the supravaginal hysterectomy with bilateral salpingo-oophorectomy. The longest individual duration of nine years, however, followed a unilateral salpingo-

oophorectomy. Among the patients who have died, the longest average length of life followed bilateral salpingo-oophorectomy, with the average length of life following panhysterectomy with bilateral salpingo-oophorectomy next in duration. The longest individual duration occurred in the one patient who died following supravaginal hysterectomy with bilateral salpingo-oophorectomy. The greatest mortality followed exploratory laparotomy, 100 per cent of the 10 patients having died, 5 from the effects of the operation, and 5 within an average of 7.5 months, the longest case having lived 26 months. These patients, however, were late cases, in which the disease was far advanced, inoperable when the abdomen was opened and, therefore, in poor condition at the time of operation.

Among the primary carcinomata, the greatest average length of life in the living patients occurred in those with carcinoma ovarii serosum

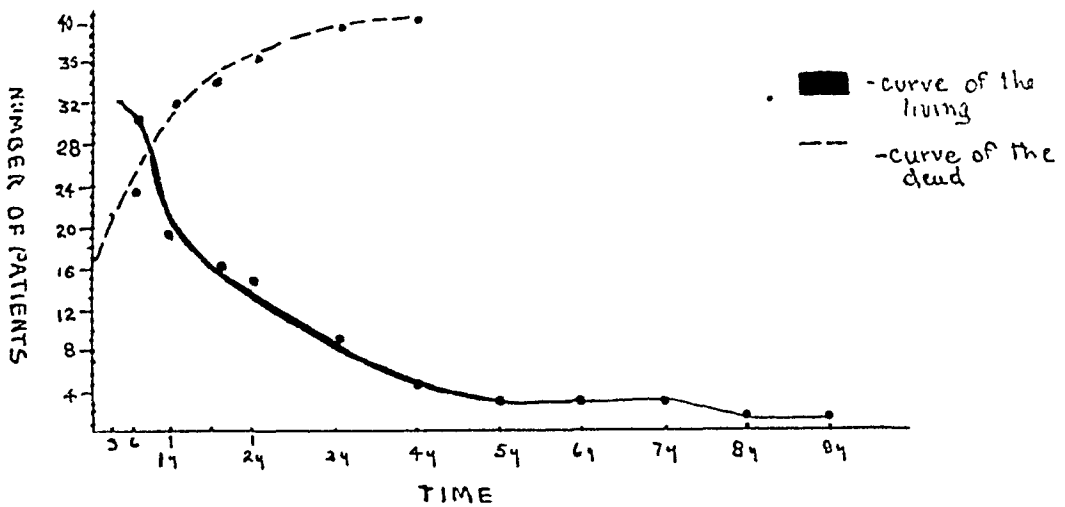


Fig. 1.

bilaterale. The average length of life in 3 cases with the unilateral type was next in order. The longest individual length of life occurred in a patient with carcinoma ovarii serosum unilaterale. She is alive nine years after operation. Among the dead, the greatest average length of life occurred in 4 patients in the series of 8 with carcinoma ovarii serosum unilaterale. The greatest individual length of life occurred in 2 patients, one with carcinoma ovarii serosum bilaterale, the other with carcinoma ovarii glandulare et solidum. The shortest average length of life in the dead occurred in the series of 2 patients with carcinoma ovarii glandulare et solidum unilaterale. The shortest individual length of life occurred in 2 patients, one with carcinoma ovarii pseudomucinosum unilaterale, and one with carcinoma ovarii glandulare et solidum unilaterale. The greatest operative mortality occurred in patients with carcinoma ovarii glandulare et solidum bilaterale, 66 per cent of the patients having died from the effects of operation.

Of the two secondary carcinomata listed, the patient with the metastatic growth from the uterus is still alive after 55 months, the primary tumor having been removed at operation. The patient with the Krukenberg tumor, metastatic from the stomach, died within 5 months.

It is unfortunate that, aside from the data for the serous group, a larger series of cases could not have been obtained so that perhaps more accurate statistics might be compiled.

The living patients without metastasis at operation in a series of 35 cases have lived, on an average, 18 months longer than those with metastasis. Among those who have died, the patients without metastasis survived those with metastasis by 6 months. Therefore, it would seem that metastasis present at operation materially shortens the post-operative period of life.

THE INCIDENCE OF CARCINOMA IN THE CERVIX FOLLOWING SUPRAVAGINAL HYSTERECTOMY

BY SAMUEL S. HOCHMAN, M.D.

CHARACTER AND EXTENT OF ORIGINAL DATA

THE object of this study is to determine the incidence of carcinoma in the cervical stump after supravaginal hysterectomy for reasons other than malignancy, with special reference to the technic employed regarding the cervix. The follow-up records of the supravaginal hysterectomies performed at the Woman's Hospital during the five years from 1918 to 1922 inclusive, were carefully reviewed for any evidence of malignancy. The histories of all the cases of carcinoma of the cervix admitted during the same period of time were also examined to see whether a supravaginal hysterectomy had been done elsewhere, prior to entrance into the Woman's Hospital. In so far as possible, information was obtained from the other hospitals and surgeons regarding the cases in question. Most of the surgeons who had done the operations here, and with whom it was possible to communicate, were personally asked whether any of their cases had subsequently developed malignancy of the cervical stump, subsequent to the operation, and what their technic regarding the cervix was.

In a series of 1,114 hysterectomies (supravaginal), there was an occurrence of only 3 cases of malignancy of the cervical stump, or 0.27 per cent, up to the present time.

Of the total number of operations, 377 had also a reaming out of the cervical mucous membrane, of which 1 or 0.26 per cent developed carcinoma of the cervical stump subsequently, this technic evidently not preventing future malignancy.

The stump and cervical canal were carbolized in 595 of the operations, and of these, 2 or 0.33 per cent developed future malignancy, proving that this technic also is no safeguard against future malignancy. However, the surgeons who use it do not hope for absolute freedom from malignancy in the future, but freedom from infection with cervicitis and endocervicitis.

During the same period of time, 1918 to 1922, all the cases of carcinoma of the cervix, excluding readmissions, of course, were reviewed for a history of a previous supravaginal hysterectomy. There were 263 new admissions, of which 7 had a positive history of a supravaginal hysterectomy for a nonmalignant condition. I say positive because in several instances, which have been excluded from this series, although the diagnosis was made clinically and pathologically of carcinoma of the cervix, further investigation proved that the operation had been a panhysterectomy or in two cases supravaginal hysterectomy for carcinoma of the uterus.

Of the above 7 cases of malignancy, 3 were operated in this hospital, and are included in the table of supravaginal hysterectomies. The remaining 4 were operated on at other hospitals and although every effort was made to secure information regarding them from their surgeons and places of operation, very little was obtained.

CONCLUSIONS

1. In a series of 1,114 supravaginal hysterectomies at Woman's Hospital, 3 or 0.27 per cent developed subsequent carcinoma of the stump.

2. In a series of 263 cases of carcinoma of the cervix, 7 or 2.66 per cent had had a supravaginal hysterectomy for a nonmalignant condition, at which time, 4 of the 7 cases were most likely coexistent, leaving only 1.14 per cent truly subsequent cases of carcinoma.

3. In 377 of the operations with coning out of the cervix, 1 or 0.26 per cent developed carcinoma of the cervical stump.

4. In 595 of the operations with carbolization of the stump, 2 or 0.33 per cent, developed future malignancy.

5. Coning out of the cervix helps prevent future infection, and in a great measure, future carcinoma of the cervical stump. This technic takes no more time than carbolization, which does not even prevent infection, much less cancer, and should be adopted as a routine in supravaginal hysterectomy.

6. The occurrence of carcinoma in the stump of the cervix does not warrant a panhysterectomy with its much greater mortality. In the above series, 1,111 cervixes would have needlessly been removed with the loss of the keystone of the arch and complications resulting from a disturbance of the pelvic anatomy. Moreover, even panhysterectomy does not give assurance of freedom from future malignancy.

7. Where a definite pathologic cervix which is lacerated or infected—especially where discharge is present, exists at the time of the supravaginal hysterectomy, it should be removed then or as soon as possible.

8. All cases after a supravaginal hysterectomy should have an adequate follow-up system with definite periodic examinations for any changes in the cervix and for any history of bleeding or discharge. This is extremely important for the early detection of carcinoma, with favorable prognosis by early treatment, especially radiation.

9. A very careful examination should be made of the cervix at the time of operation (hysterectomy) to decide whether the cervix should be removed with the uterus, and if not, in all doubtful cases, a sufficient amount should be excised for pathologic examination. This is especially important where any degeneration or necrosis exists in the uterus.

10. There is a definite relationship between myoma and carcinoma of the uterus.

A STUDY OF THE EFFECT OF ETHER ANESTHESIA ON THE ISOAGGLUTININS OF HUMAN BLOOD

BY PHILIP REICHERT, A.B., M.D., AND MORRIS BEAKE, A.B., M.D.

Blood groups are determined in the Woman's Hospital by mixing in a hanging drop the citrate-washed blood cells with high titer known sera, and the agglutination reaction is observed by microscope after a half hour at room temperature. Direct combination of the patient's serum and the donor's corpuscles is done in addition in a similar manner. The procedure has given clinically satisfactory results in a great many cases.

In September, 1922, Levine and Segall⁵ reported three cases of prolonged ether anesthesia (two to two and a half hours) in which the patient's serum collected in the twenty-four hours immediately following the operation coagulated the cells of donors who had been matched before the operation and whose cells they did not then coagulate. This report was disquieting not only from a clinical standpoint, but it needed immediate confirmation or rebuttal from the laboratory, for it seemed to disprove all the universally credited notions of the immutability of the agglutinin groups.

We determined, therefore, to group in the usual way a consecutive series of fifty patients in the Woman's Hospital immediately before and immediately following a major operation. Of these we report thirty-eight cases since we eventually selected as worthy of note only those in which the time of anesthesia was more than an hour.

In each case there are noted the operations performed and the comparative blood pressures as an index of the effect of the procedure on the general system. The preoperative blood samples were taken in the twenty-four hour period immediately preceding the operation; the postoperative sample was taken in no case more than five hours after the procedure—in the vast majority of the cases not more than twenty minutes had elapsed since the operation and the patient was still in profound narcosis as the sample of blood was taken.

While this work was being completed there appeared a report by Huck and Peyton of Johns Hopkins⁹ stating that an exhaustive series of tests had been made on 25 operative cases before and after ether anesthesia, and had in no instance shown the serious changes described by Levine and Segall. At the end of our series we find ourselves confirming the Johns Hopkins investigators.

CONCLUSIONS

1. Prolonged ether anesthesia was not found to cause any change in the isoagglutinative phenomena of the human blood.

2. We find no evidence for believing that when patients are transfused within the twenty-four hour period following a profound ether anesthesia from donors previously matched and found suitable, any severe reaction that may chance to occur can be traced to changes in the isoagglutinative phenomena of the recipient's blood.

POSTTRANSFUSION REACTIONS: A REVIEW OF 190 TRANSFUSIONS PERFORMED AT THE WOMAN'S HOSPITAL, NEW YORK CITY

By M. C. SOUTER, A.B., M.D., AND GARRETT D. DURYEA, A.B., M.D.

We have reviewed 190 transfusions performed on 167 patients from July 1, 1922, to April 1, 1924. This is the total number of transfusions done at the Woman's Hospital during that period, with the exception of 12 transfusions given to obstetrical patients, which were not considered in this series. Of the 167 cases 161 were operated upon.

BLOOD GROUPING

The Moss classification is used as the standard and the grouping of all patients is done by laboratory technicians who use the Moss hanging drop method. The test is easily performed; the apparatus is quickly set up; and the presence or absence of agglutination is observed under the microscope. Half an hour is allowed to elapse after the preparation of the drop before concluding that there is no agglutination. Furthermore, in all the cases except three, the donor's

and recipient's blood were matched directly. A hanging drop preparation is made with the recipient's serum and the donor's cells in a 1:20 dilution with 3 per cent sodium citrate solution. This is examined after half an hour for evidences of agglutination. In the three emergency cases which were not directly matched severe reactions followed. It was found that the reactions had been due to misgrouping. This shows that unless a reliable laboratory is at hand to carry out accurate grouping the direct testing of donor's and recipient's blood is the only way to be sure of their compatibility.

TRANSFUSION TECHNIC

The method of transfusion used in all cases is the syringe cannula method of Unger for the transfusing of whole unmodified blood.

* * * *

The frequency in appearance of the various manifestations of reaction was represented as in Table I.

TABLE I

MANIFESTATIONS OF REACTION	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
Chill	40	81.6
Temperature rise of at least 2.5 degrees	27	55.1
Edema	3	6.1
Nausea or vomiting	5	10.2
Urticaria	5	10.2
Headache	4	8.1
Respiratory distress	2	4.0
Pain in joints	2	4.0
Diarrhea	1	2.0
Unconsciousness	1	2.0

The time elapsing before the appearance of symptoms varies widely as shown in Table II which represents 43 cases in which the time was recorded.

TABLE II

TIME	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
Immediately	8	18.6
Less than 4 hours	23	53.4
4 to 12 hours	2	4.6
12 to 24 hours	2	4.6
24 to 36 hours	8	18.6

Table II indicates that the majority of reactions occurred in less than 4 hours from the time of transfusion.

Chills were present in 40 cases. There was a great variation in degree of severity, from a chilly sensation lasting a very few minutes to a severe chill lasting one hour. Tables III and IV indicate the type and the duration of chills.

TABLE III

TYPE OF CHILL	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
Chilly sensation	3	7.5
Moderate	32	80.0
Severe	5	12.5

TABLE IV

DURATION OF CHILL	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
1 to 5 minutes	8	21.6
5 to 15 minutes	12	32.4
15 to 30 minutes	7	18.9
30 to 60 minutes	10	27.0
Not recorded	3	

It is evident that the greater number of chills were moderate and lasted from 5 to 15 minutes.

In 27 of the cases there was a rise of temperature of at least 2.5 degrees, the average rise being 3.7 degrees. The duration of the temperature varied widely, the greatest number lasting for less than four hours as shown in Table V.

TABLE V

DURATION OF TEMPERATURE	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
Less than 4 hours	9	33.3
4 hours to 8 hours	7	25.9
8 hours to 12 hours	2	7.4
12 hours to 24 hours	6	22.2
24 hours to 36 hours	1	3.7
36 hours to 72 hours	2	7.4

As has been stated, of the 190 cases transfused 49 cases or 25.7 per cent had reactions. Therefore, these figures are used as the basis for determining the factors which may cause reactions. The factors to be considered are:

I. *Blood Relationship*.—The relative frequency of reactions in cases where donor and recipient were or were not blood relatives is shown in Table VI.

TABLE VI

BLOOD RELATIONSHIP	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF REACTIONS
Yes	68	15	22.0
No	102	32	31.3
Not recorded	20	2	....

II. *Blood Groups*.—Table VII shows a comparison between the percentage of reactions when a universal or group IV donor was used and when the recipient and donor were in the same group.

TABLE VII

GROUPING	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF • REACTIONS
Not recorded	8	..	....
Donor and recipient of same group	147	41	27.8
Universal donor	35	5	14.3
(Donor Recipient)			
(IV I)	1	0	0.0
(IV II)	22	4	18.1
(IV III)	12	1	8.3

It is evident that using a universal donor does not increase the number of reactions.

The relative number of reactions in the different blood groups of 190 cases transfused are shown in Table VIII.

TABLE VIII

BLOOD GROUP	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF REACTIONS
I	3	1	33.3
II	52	15	28.8
III	22	4	18.1
IV	105	29	27.6
Not recorded	8	..	....

There is practically no difference in the percentage of reactions in each group. If a factor of incompatibility does influence reactions it is one which is not detected by ordinary laboratory methods of grouping individuals.

III. *Operator*.—Does the causative factor of reactions lie in the skill and ability of the one who performs the transfusion? Table IX shows that there is a wide variation in the percentage of reactions in transfusions performed by different operators.

TABLE IX

OPERATOR	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF REACTIONS
A	28	4	14.2
B	28	7	25.0
C	17	1	5.8
D	14	4	28.0
E	13	4	30.0
F	1	1	100.0
G	7	2	28.5
H	9	5	55.5
I	21	5	23.8
J	24	4	16.6
K	5	3	60.0
L	11	1	9.0
M	12	8	66.0

If one accepts the theory of Drinker and Brittingham, that reactions are due to the formation of abnormal proteins as the result of

destruction of the blood platelets during the operation, the skill and deftness of the operator surely would be a factor of considerable importance. It is shown in Table IX that some operators do have a higher percentage of reactions. It would be difficult to estimate the importance of this factor as a cause.

IV. *Time*.—The transfusions were either preoperative, performed during the operation, or postoperative.

Table X shows that the highest percentage of reactions occur in cases which were transfused before operations. This is probably due to the fact that the patient is at that time better able to respond to the introduction of a foreign substance.

TABLE X

TIME	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF REACTIONS
Preoperative	91	34	37.3
During operation	13	0	0.0
Postoperative	53	15	28.3
Not recorded	33		

V. *Amount of Blood Given*.—The relative frequency of reactions following the transfusion of varying amounts of blood is shown in Table XI.

TABLE XI

AMOUNT	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF REACTIONS
Less than 300	10	3	30.0
300 to 500	30	7	23.3
500 to 700	135	35	25.9
700 to 900	8	1	12.5
Not recorded	7		

From Table XI it would appear that up to a certain point the larger the amount of blood transfused at one time the greater the number of reactions. It is a question whether small amounts of blood (less than 500 c.c.) given frequently would be followed by fewer reactions than are large amounts given at one time. The comparative ease of the technic makes the former possible now whereas it was not possible a few years ago. This problem falls into the scope of the discussion of the next factor.

TABLE XII

TRANSFUSIONS	NUMBER OF TRANSFUSIONS	NUMBER OF REACTIONS	PERCENTAGE OF REACTIONS
First	147	42	28.5
Second	17	6	35.2
Third	3	2	66.6
Not recorded	23	..	....

VI. *Repeated Transfusions.*—Table XII shows the increase in the number of reactions in subsequent transfusions. It may be noted here that no patient had more than one reaction.

* * * *

What effects do posttransfusion reactions have upon the general condition of the patient as indicated by her pulse and blood pressure, and upon the benefits which the patient should derive from the transfusion? Change in pulse rate is the first thing to be considered. Tables XIII and XIV are a comparison between the rise and fall of the pulse rate in the patients who had had no reactions and those who had had reactions. The time period for the rise or fall was forty-eight hours.

TABLE XIII
PATIENTS WITH NO REACTIONS

PULSE	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS	AVERAGE VARIATION IN POINTS
Rise	33	32.0	12.1
Fall	57	55.3	13.9
No change	13	12.6	....
Not recorded	87	....	....

TABLE XIV
PATIENTS WITH REACTIONS

PULSE	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS	AVERAGE VARIATION IN POINTS
Rise	24	55.8	13.5
Fall	15	34.8	12.8
No change	4	9.3	....
Not recorded	6	....	....

From Tables XIII and XIV it is evident that after transfusion the pulse rate had a tendency to fall except in cases where reactions caused a rise. The average actual rise or fall in pulse rate was practically the same both in cases with and without reactions.

There was a somewhat constant variation in blood pressure in those cases which had reactions and those which did not. In the greater percentage of cases with reactions the blood pressure was raised. In the majority of cases without reactions the blood pressure fell. This is shown in Tables XV and XVI. When the systolic pressure was raised and the diastolic fell or vice versa, that case was classified as irregular. In other cases both the systolic and diastolic pressure either fell or rose together.

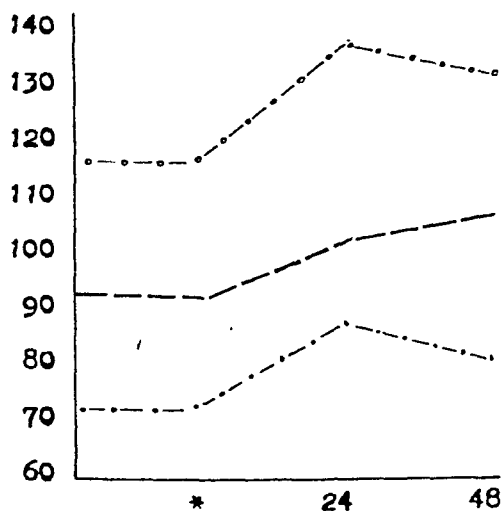
As indicated in Tables XV and XVI reactions have a tendency to raise the blood pressure. In patients who have a very high blood pressure before transfusion this fact gains importance and may cause serious results.

TABLE XV
PATIENTS WITH NO REACTIONS

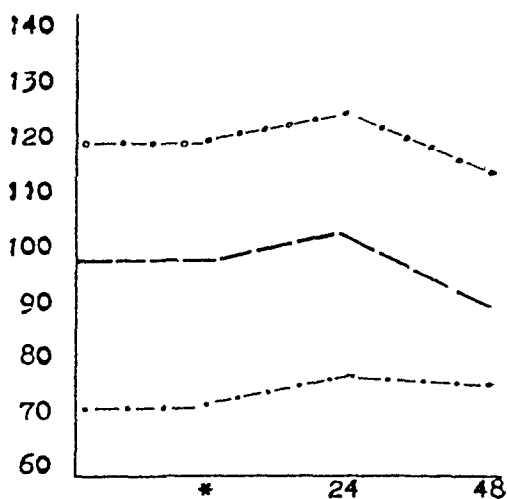
BLOOD PRESSURE	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
Rise	28	32.2
Fall	33	37.9
Irregular	22	25.2
Not changed	4	4.5
Not recorded	54	....

TABLE XVI
PATIENTS WITH REACTIONS

BLOOD PRESSURE	NUMBER OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS
Rise	13	30.9
Fall	12	26.1
Irregular	14	33.3
Not changed	3	7.1
Not recorded	7	....



REACTIONS



NO REACTIONS

Key to Graphs

Abscissa = hours
Ordinate = points of rise or fall
* = time of transfusion

Systolic pressure =
Diastolic pressure = -.-.-.-
Pulse rate = -----

Graphs 1 and 2.

In order to illustrate the average rise and fall in points of the pulse and the systolic and diastolic pressure Graphs 1 and 2 have been made. The first represents such curves for those patients with reactions—the second for those without reactions.

It is interesting to note the results of investigation in order to discover what influence reactions have on the desired benefits of transfusion—that is, upon the hemoglobin determination and red blood cell count. The data available cover observations of these two

points only during a period of forty-eight hours. The ultimate benefits to the patient after this short period were not recorded.

Table XVII shows the percentage of cases with and without reactions which had either an increase or a decrease in hemoglobin. It also shows the average percentage of increase or decrease.

TABLE XVII

HEMOGLOBIN	NO. OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS	NO. OF CASES WITH REACTIONS	PERCENTAGE OF CASES WITH REACTIONS	NO. OF CASES WITHOUT REACTIONS	PERCENTAGE OF CASES WITHOUT REACTIONS
Rise	138	87.3	42	91.3	96	85.7
Fall	20	12.6	4	8.6	16	14.2
Not recorded	32	....	3	....	29	....

In the total number of transfusions there was an average rise of 29.8 per cent in the hemoglobin and an average fall of 16 per cent. In the cases with reactions the average rise of hemoglobin was 35.6 per cent, the average fall 13.7 per cent, while in those cases without reactions the average rise and fall were 27.2 per cent and 16.6 per cent respectively.

TABLE XVIII

RED BLOOD CELL	NO. OF TRANSFUSIONS	PERCENTAGE OF TRANSFUSIONS	NO. OF CASES WITH REACTIONS	PERCENTAGE OF CASES WITH REACTIONS	NO. OF CASES WITHOUT REACTIONS	PERCENTAGE OF CASES WITHOUT REACTIONS
Rise	134	84.2	42	93.3	92	80.7
Fall	25	15.7	3	6.6	22	19.2
Not recorded	31	....	4	....	27	....

Table XVIII shows a comparison in the rise and fall of the red blood cell count in cases with and without reactions. In the total number of transfusions there was an average rise of 26.1 per cent in the red blood cell count and an average fall of 12.8 per cent. In the cases with reactions the average rise in the red blood cell count was 30.5 per cent, the average fall 13.5 per cent, while in those cases without reactions the average rise and fall were 24.1 per cent and 12.7 per cent respectively.

Tables XVII and XVIII show unexpected and interesting results. The fall in hemoglobin and red blood cells is chiefly found in cases which were transfused either during operation or following operation. It is evident from the tables that there is a higher percentage of cases with an increase in both hemoglobin and red blood cells among those patients who had reactions than among those patients who did not have reactions. Also the average percentage increase in both hemo-

globin and red blood cells is greater in patients with reactions. In reviewing the literature on this subject no report has been found showing the actual effect of reactions on the red blood cell count and hemoglobin determinations. Therefore, it cannot be stated whether these findings are unusual or not. One might naturally expect to find that reactions delayed the rise in hemoglobin and red blood cells and lessened the benefits of transfusion. From this investigation it would seem that reactions had the opposite effect. The process which brought about these results may be similar to that occurring when foreign protein injections are given. The injection of proteins, such as milk in cases of chronic infection, stirs up the natural body defenses and increases the individual's resistance. In the same way the blood forming organs may receive stimulation from posttransfusion reactions as well as from the transfused blood itself.

THE TREATMENT OF INCOMPLETE ABORTION

AN ANALYSIS OF THE MANAGEMENT OF 311 CASES OF INCOMPLETE
ABORTION TREATED AT THE WOMAN'S HOSPITAL, NEW YORK CITY
FROM SEPTEMBER, 1919 TO JANUARY, 1924

BY JOSEPH HERZSTEIN, M.S., M.D., AND IRENE DAVIS, A.B., M.D.

THE series of cases studied is composed of over 300 unselected cases treated at the Woman's Hospital during the period of September, 1919, to January, 1924. The essential purpose of the study was to determine the results of different methods of managing cases of incomplete abortion. The recent literature on the treatment of abortion contains numerous discussions of the "active" versus the "conservative" handling of such cases. The general trend of opinion is definitely in favor of conservative treatment, for septic cases especially.

Among 200 cases of septic abortion, all had a temperature of 100° or more on admission. Of these, 100 had artificial emptying of the uterus, during the febrile period and as soon as convenient. In a parallel group of 100 cases, no local treatment was applied. His results definitely favored the conservative method of treatment as indicated by Table I.

The present study was limited to cases of incomplete abortion, as based on the final diagnosis appearing on the hospital records. Cases with questionable retained secundines were ruled out, as well as those of inevitable or complete abortion.

During the period extending from September, 1919, to January, 1924, there were 311 such cases. These were admitted to the ward services of various attending surgeons and many were private cases. The choice of

method of treatment rested with the surgeon, there being no set procedure for the handling of these cases which all had to follow.

METHOD OF MANAGEMENT OF 311 CASES OF INCOMPLETE ABORTION ADMITTED FROM
SEPTEMBER, 1919, TO JANUARY, 1924

METHOD	NUMBER OF CASES	PER CENT OF TOTAL
Dilatation and curettage	212	68.2
Curettage without dilatation	8	2.5
Dilatation and curettage and other simultaneous operation*	33	10.6
Other operations	3	1.0
No operative treatment	49	15.4
Refused operation	4	1.3
Septic cases, untreated	2	0.6
Operatively treated	256	82.3
Nonoperatively treated	55	17.7
Total Cases	311	100.0

*Among these were insertion of radium pack, retroversion corrections, laparotomies, amputations of cervix, repair of pelvic floor and other gynecologic operations.

SUMMARY AND CONCLUSIONS

A statistical analysis of 311 case records of incomplete abortion treated at the Woman's Hospital during the course of approximately five years has been presented.

Both active and conservative methods of treatment have been employed.

The proportion of patients treated operatively was 81.3 per cent. The rest were not operated.

The abortions occurred in 87.1 per cent of the patients before the fourth month of gestation.

The time elapsing between the event of abortion and hospital admission varied from a few hours to several months; 30.6 per cent of the operated patients aborted one week or less before admission, while 69.4 per cent aborted one week or more before they sought relief. One-third of the patients had symptoms for a month or more before seeking hospital attention. The patients treated conservatively came to the hospital somewhat earlier.

Of the patients treated operatively, 87.5 per cent had a temperature on admission of less than 100°. Of the conservatively handled patients, 75 per cent had no temperature on admission.

The average duration of temperature before curettage was 0.26 days. The average duration of postoperative temperature was 0.9 days. The average days of temperature of the nonoperated cases was 1.5 days.

Of the curetted cases, 46.1 per cent ran no temperature at all; 45.2 per cent had a temperature on one or two days. Among the conservative cases, 58.3 per cent at no time had a temperature over 100°.

The average hospital stay for the simple curetted cases was 11.6 days, and for the conservative cases 11.8 days.

Among the cases with a simple dilatation and curettage, those that were operated soonest after admission had the shortest course of post-operative temperature and hospital stay. In afebrile cases, therefore, especially in those who have had symptoms for some time, a deferred curettage has no special merit over an early one, other than that it gives more time to study the nature of the case.

PYELITIS AS A POSTOPERATIVE COMPLICATION

By WILLIAM M. MALONEY, A.B., M.D., AND
FREDERICK H. CRACCO, A.B., M.D.

THIS paper is based on a study of those cases in which pyelitis developed as a postoperative complication following gynecologic operations in the Woman's Hospital, New York, during the period of five years ending December 31, 1923. The data given were obtained from a study of the histories of these patients and not from bedside observations.

* * * *

In going through the histories all cases showing evidence of chronic pyelitis were excluded and only those cases in which pyelitis developed as a postoperative complication following gynecologic operations were accepted. In the five year period ending December 31, 1923, there were found twenty-four such cases and Table I shows how these cases were distributed over the five years and the percentage of the total gynecologic operations performed in this period.

TABLE I

YEAR	OPERATIONS	COMPLICATION OF PYELITIS	PER CENT
1919	1483	2	0.13
1920	1339	4	0.29
1921	1598	4	0.25
1922	1577	8	0.51
1923	1312	6	0.46
Total	7300	24	0.33

This study was undertaken for the purpose of determining, if possible, why this complication of pyelitis occurred, and in going through the histories of these twenty-four cases I have endeavored to consider all factors which might have any bearing on the problem.

The important points shown in Table II* are (a) that twenty-one of the twenty-four patients were married and of these nineteen had had one or more pregnancies. (b) Instrumental deliveries and previous

*Omitted for lack of space.

operations, especially those on the pelvic organs, and in this connection we must consider the possibility of a residual low grade infection being left behind which was stirred up by the recent operation just previous to the onset of their attack of pyelitis.

Table III* gives the type of operation which these patients had just previous to their attack of pyelitis, also the surgical pathology found and the condition of the wound. The type of operation is similar in each case but some of those operative procedures were more extensive than others, and the surgical pathology is given as far as it was available in the histories. Infected wounds are a likely source of infection in pyelitis, as the infecting organisms can be carried by way of the blood stream to the kidneys; however, in this series infected wounds were not very numerous and the few that did occur soon cleared up.

Since pyelitis followed all of these operative procedures the question naturally arises as to just what part, if any, these operations played in the etiology of this complication. The trauma and shock of the operation would certainly lower the resistance of the patient against infection to a very considerable extent and foci of infection (if present), which would be held in control under normal conditions, would now have an opportunity of starting lesions in other regions of the body and especially in the kidney. Also in cases of salpingitis a low grade of infection usually persists in this region after the acute process subsides. Operations for the relief of this condition are likely to stir up this infection, which gets to the kidney by way of the blood stream, and may cause pyelitis. The same would apply after operations for appendicitis. It is also to be noted that the pelvic floor was repaired in twelve or half of these cases. The field of this operation is far from being sterile and it is possible that infection may have been introduced in at least some of these operations, which later reached the kidney and caused the pyelitis, but I cannot supply any definite proof that this actually occurred. Just how much importance we are justified in assigning to this possibility must, for the present at least, remain a matter of speculation.

From a study of Table IV* it will be seen that in two cases the attack occurred the same day as the operation. In the rest of the cases the earliest onset was three days after and the latest was twenty-one days after the operation. The average period elapsing between operation and onset was 7.3 days. Eighteen of these patients gave a history of constipation before operation and the colon bacillus was present in twenty-one out of the twenty-four cases. This prevalence of the colon bacillus can be accounted for by the fact that the cecum and ascending colon have lymphatic connections with the right kidney which are not found on the left side and, also, this organism can

*Omitted for lack of space.

reach either kidney by way of the blood stream. From these facts it is pretty clear that in constipation we have one of the chief causes of pyelitis.

In the five year period ending December 31, 1923, there were 7300 gynecologic operations and of these only 24 cases developed pyelitis following operation, yet every case had about the same amount of catharsis. It would therefore appear that this theory regarding catharsis does not hold, and until some definite proof is at hand I don't think we can consider catharsis as an active cause of pyelitis.

Cystitis was recorded in only two cases and was most likely the result of the existing pyelitis rather than its cause.

Catheterization is sometimes considered as a possible cause of pyelitis. Table IV* shows that these patients were usually catheterized once before operation and as often as necessary after operation until they voided spontaneously. Since it was done under sterile precautions I think we can safely eliminate it as a cause of pyelitis, and since it prevented retention during a period when the urine contained bacteria it seems reasonable to consider it as a prophylactic measure against pyelitis rather than a possible cause.

From a study of Table V it will be noted that with one exception each case had just one attack of pyelitis. The duration of these attacks varied from two days up to twenty-nine days, the average duration being twelve days. *B. coli* was the organism most often found. It occurred alone in eighteen cases, with *Staphylococcus albus* twice and with *streptococcus* once.

Regarding treatment these patients were kept in bed, given a light diet and quantities of fluids. The only medicinal treatment given was acid sodium phosphate and urotropin. Two cases had bladder irrigations and the last two cases had high colonic irrigations in addition to the above-mentioned drugs. Two cases did not get any drug treatment and, although the infecting organism was not *B. coli*, these cases cleared up spontaneously in seven and two days respectively, which was well within the average duration of these attacks. This occurrence would cast some doubt on the efficiency of acid sodium phosphate and urotropin in the treatment of pyelitis.

The chief etiologic factors of pyelitis following operations as shown by studies of the histories of these cases are: (1) Constipation; (2) operations for relief of chronic conditions such as appendicitis and salpingitis; (3) operations on the pelvic organs such as hysterectomy, ovariectomy, etc.; (4) operations around the rectum such as perineorrhaphy, and (5) lowering of the patient's resistance (general and specific) to infection. Kretschmer⁴ in reviewing 200 cases of pyelitis states that 30 per cent of these patients gave a history of constipation of varying degree for which laxatives and purgatives were freely used. In a small number of cases the patients suffered from

*Omitted for lack of space.

lesions of the rectum such as hemorrhoids and from lesions of the anus such as fissures and fistulae. Sixty-one per cent of the cases occurred in females and 39 per cent in males.

CONCLUSIONS

1. The chief etiologic factors of pyelitis following gynecologic operations are:

- (a) Lowering of patients' resistance (general and specific) to infection due to trauma and shock of operation.
- (b) Constipation.
- (c) Operations for relief of chronic disease.
- (d) Operations on the pelvic organs and around the rectum.
- (e) Focal infections.
- (f) Ascending infections by way of the lymphatics or by ureteral reflux.

2. The question of focal infection should receive careful attention on physical examination.

3. That such drugs as alkalies, urotropin, etc., usually used in the treatment of pyelitis are inefficient.

4. That pelvic lavage is the most efficient treatment for pyelitis.

News Items

New York, N. Y. Dr. B. P. Watson of Edinburgh, Scotland, has been appointed Chief of the Sloane Hospital for Women.

St. Louis, Mo. Dr. Otto H. Schwarz has been appointed Professor of Obstetrics in the Medical School of the Washington University.

The American Journal of Obstetrics and Gynecology

VOL. XI

ST. LOUIS, MAY, 1926

No. 5

Original Communications

A CLASSIFICATION OF THE TOXEMIAS OF THE LATTER HALF OF PREGNANCY

BY H. J. STANDER, M.D., AND C. H. PECKHAM, M.D., BALTIMORE, MD.

(From the Department of Obstetrics, Johns Hopkins Hospital and University)

THE present method of classification of the toxemias of pregnancy is admittedly inadequate, and it occurred to us that by correlating the findings in a large series of patients it might be possible to gain information which would throw light on the problem. It will be apparent even to the casual observer that studies upon repeated pregnancies occurring in the same individual should be of especial value in an endeavor to find a basis for such classification. With this in mind we studied the histories of the patients with toxemia of pregnancy who were admitted to the clinic during the past five years, and we have paid particular attention to those with more than one admission. Viewing the data obtained in a perspective manner, rather than by studying an isolated case, has led us to somewhat surprising conclusions.

In the tables we have given only such information as was considered to bear upon the question under discussion. Age, parity and the duration of pregnancy are undoubtedly essential. The common complaint of headache, swelling of the feet, ankles, and other parts of the body, and disturbances of vision, as well as the objective findings upon ophthalmologic examination, have been recorded. The systolic and diastolic blood pressure and the laboratory findings on the urine and blood furnish perhaps the most important information. In addition, we have given the number of convulsions, if any, the weight, the fluid intake and output, the results of the phenolsulphonephthalein kidney test, the treatment in brief outline, together with some remarks regarding the patient's dispensary history, and the type of delivery, with especial reference to the outcome both to the patient and to her child.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

The laboratory findings constitute two groups: those on the urine and those on the blood. In the first group we have given the albumin, as determined by the Esbach method, in grams per liter of urine. Both the urea and the ammonia nitrogen are expressed as percentages of the total nitrogen in the urine, and are shown in the columns labelled "Urea-N% of T. N." and " $\text{NH}_3\text{-N\% of T. N.}$," respectively. In the microscopic examination we have recorded only the presence or absence of casts and their types. The blood analyses consist of the determination of the nonprotein nitrogen (N. P. N.), the uric acid, the urea nitrogen expressed as a percentage of the nonprotein nitrogen (Urea-N% of N. P. N.), as well as that of the sugar, the carbon dioxide combining power, and the chlorides. All of these, with the exception of the urea nitrogen and CO_2 , are expressed in milligrams per 100 c.c. of blood. The CO_2 is written in volumes per cent. The methods employed in these analyses are those referred to in previous publications from this department.

In the column designated "Diagnosis" we have given the diagnosis made at the time of discharge, while in another column, appearing on the extreme right side in some of the tables, we have added a "Corrected Diagnosis," containing our own opinion with reasons.

By a study and evaluation of all the findings under the different headings, we have been able to arrange the toxemias into different groups. We shall first discuss the more definite types and then give our views concerning a new group.

GROUP I. ECLAMPSIA

Table I gives the findings for all the cases of typical eclampsia, for the period Jan. 1, 1923, to Feb. 1, 1926. There were 41 admissions, and two of them concern the same patient. There were actually more cases of eclampsia during this period, as will be shown in the discussion under Group II.

The predominating features of the eclamptic group are as follows:

1. Usually a very high blood pressure, a large amount of albumin in the urine and a definite increase in the uric acid in the blood during the time of the convulsions.
2. A complete disappearance of these abnormal findings within two to three weeks following the attack of eclampsia.
3. In certain cases an exceedingly low carbon dioxide combining power and an elevated blood sugar, as has already been outlined by one of us. Such patients usually have a high ammonia coefficient.
4. In over 60 per cent of the cases eclampsia appears in the primiparous woman.
5. Nearly all the patients in this group present marked edema.
6. A fatal outcome for the mother is not always associated with a large number of convulsions, although this is usually the case.

The eclamptic group constitutes a definite entity and thus further discussion here hardly seems warranted.

GROUP II. PRE-ECLAMPSIA

There are a few patients who do not fall into the eclamptic class, although they present a picture almost identical with it, except that there are no convulsions or coma. It is this type of toxemia which we

believe may be called "pre-eclampsia." The last two patients in Table II are the only ones among all of our toxemia studies whom we believe can be designated as "pre-eclamptic." These show a great amount of albumin in the urine and a high blood pressure level prior to delivery. After birth of the child, there is a prompt return to a normal blood pressure level and an albumin-free urine. We have grouped these two patients with four eclamptic women on whom we have made repeated studies, and we shall discuss their subsequent pregnancies after the other groups have been considered.

From the figures in Table II it appears that "pre-eclampsia" is the stage just preceding the outbreak of convulsions, or what we designate as typical eclampsia. It is indeed quite probable that pre-eclampsia is a manifestation of the same disease entity as eclampsia and differs from it only in so far as coma and convulsions do not occur. For this reason the pre-eclamptic patient should be considered as a potential eclamptic, and as soon as the existence of the condition is recognized it should be regarded as an urgent indication for termination of the pregnancy in order to prevent the outbreak of actual eclampsia.

It is interesting to note how small a proportion of the total number of our toxemic patients fall into this group; so that if our views are accepted they will effect a marked diminution in the number of cases designated as pre-eclamptic toxemia.

GROUP III. CHRONIC NEPHRITIS COMPLICATING PREGNANCY

A study of the cases in Table III will show that they all reveal signs of permanent kidney damage. The outstanding characteristics of this class are as follows:

1. The last pregnancy shows more renal involvement than the one preceding it. Usually this is shown by the fact that a rising blood pressure and the presence of albumin in the urine are noted far earlier in pregnancy than was the case in the previous pregnancy. This is true for all of our patients except one, and even in that case there was a higher blood pressure and more albumin in the urine at the end of the puerperium following the second pregnancy than after the first pregnancy.
2. The nitrogen partition in the urine is often disturbed, the ammonia nitrogen increasing and the urea nitrogen being relatively less in amount.
3. In some cases nitrogenous retention in the blood becomes quite appreciable, as is shown by a rise in the nonprotein nitrogen, as well as in the urea nitrogen.
4. Edema is quite marked in a large percentage of cases and sometimes persists throughout the puerperium.
5. At the end of the puerperium following the last pregnancy the blood pressure, especially the diastolic, has not returned to the normal level; and there is usually some albumin in the urine.

The cases in this class can probably be divided into two subgroups, namely, those who had developed a chronic nephritis prior to their first pregnancy, or between pregnancies, from such causes as scarlet

TABLE I—ECLAMPSIA
(Total 41 cases; 13 shown in this table)

NUMBER	AGE	PARA	PRIG- NANCY	DATE	HEAD- ACHE	EDEMA	EYES	CON- VOL.	H. P. SYS.	D. P. DIAS.	URINE				BLOOD				REMARKS	
											Alb. Gm.	Urea N % T.N.	NH ₄ N % T.N.	Micro- scopic	N. P. N.	Uric Acid	Urea N % N. P. N.	Sugar		CO ₂
13,923	16	1	7 mo.	8/31/24	++	++		15	180	110	9.5	66.1	21.1	Many casts	40.8	7.5	69		24.5	Child premature Stillborn. Macerated
14,051	41	15	9 mo.	9/14/24 10/ 1/24	+++	++		22	128 184	88 110	0.1 32.5	86.8 41.4	4.8 3.2	No casts Many casts	60.0	8.8	22		12.4	Delivery spontaneous Premature Child died 1st day
14,096	22	1	Term	10/20/24	No	No		25	130	100	0.1	78.2	8.4	No casts	40.0	4.0	50	189	48.1	Delivery (forceps) on 10/12/24
14,102	18	1	Term	10/11/24	++	++		105	160	110	1.0	68.1	13.7	Few casts	40.0	7.3	30	109	15.5	Child normal
14,102	18	1	Term	11/ 1/24	No	No		8	150	112	0.7	81.1	8.5	No casts	60.0	5.3	21	400	16.8	Delivery spontaneous (Bougie on 10/21/24) Child normal
14,124	17	1	Term	10/15/24	+++	+++		11	120	90	0.0	86.0	4.2	No casts	28.2	4.7	33	127	33.8	Child normal
14,127	18	1	9 mo.	10/22/24	No	No		7	192	124	2.2	74.3	11.9	Few casts	35.3	3.6	20	167	52.6	Delivery (forceps) on 10/23/24
14,344	33	4	Term	11/10/24	++	++	Few retinal hemorrhages	114	108	70	0.2	80.2	4.1	No casts	35.3	5.3	20	118	49.8	Child normal
14,529	29	1	Term	10/20/24	+	++		1	194	119	5.0	66.1	5.4	No casts	41.0	4.0	48	103	56.7	Delivery (forceps) on 10/22/24
14,532	23	1	Term	11/10/24 12/28/24	No	No	Retinal edema	1	220	128	12.0	62.5	6.5	No casts	27.3	3.8	32		56.7	Delivery spontaneous on 12/30/24 Child normal
14,533	23	1	Term	1/16/25 2/ 6/25	++	+++	Some retinal edema	7	126	82	0.75	55.0	9.0	No casts	35.3	3.1	32	122	46.2	Delivery (Brecht) twins Children normal
14,613	25	1	Term	2/28/25	++	++		1	116	74	0.1	72.4	7.0	No casts	37.5	3.6	35	143	31.9	Delivery (forceps) Child normal
14,633	36	4	9 mo.	2/ 7/25 2/28/25	+	++	Slight retinal edema	2	203	124	8.0	70.5	7.8	Many casts	31.6	3.6	21	130	38.7	Delivery spontaneous Child normal
14,941	15	1	9 mo.	3/ 2/25 3/20/25	No	No	Exam. neg.	2	170	105	15.0	76.5	10.9	No casts	35.5	4.7	41	190	29.8	Delivery (forceps) Child normal
15,002	37	4	7 mo.	2/24/25 3/24/25	+	++	Few hemor- rhages	11	96	68	0.3	60.9	10.9	No casts	31.6	4.0	50	125	43.1	Delivery (Bag) on 3/3/25 Child stillborn
				5/21/25 6/ 5/25	+++	+++	Exam. neg.	3	165	90	0.0	79.2	3.2	No casts	33.3	4.0	105	105	27.1	Delivery (forceps) on 5/22/25 Child normal.
				5/28/25 6/19/25	+++	+++	Exam. neg.	4	120 165	38 110	0.1 25.0	85.4 60.0	7.4 22.1	No casts No casts			182	182	28.1	Delivery spontaneous (Bougie) on 6/7/25 Child premature. Stillborn

fever, tonsillitis, infectious diseases, myocarditis, or any of the conditions which may lead to chronic nephritis; and those in whom repeated pregnancies might have played a rôle in the development of the nephritis. The past history of the patient will prove of value in determining such relations.

It is highly important that the obstetrician determine whether or not the toxemia falls into this group, for his advice to the patient and the treatment of the pregnancy will be governed accordingly. When there are definite signs of chronic nephritis it is unwise to allow the occurrence of further pregnancies, for each subsequent pregnancy leads to an earlier "break" in the kidneys and to more permanent damage to the renal tissue. In exceptional instances the mother is overanxious to have a living child and is willing to make any sacrifice for that purpose, but such are very rare.

GROUP IV. ECLAMPSIA SUPERIMPOSED UPON NEPHRITIS

In Table IV appear the data afforded by a number of patients who were discharged with the diagnosis of "nephritic toxemia with convulsions." In this table, as well as in Table I, we have given only the findings for the day before delivery, or during the convulsion period, and for the day of discharge.

Of the five patients in this table, three undoubtedly have a definite chronic nephritis, while the other two present signs of a mild nephritis; at the same time, it seems quite doubtful to us that the convulsions in these five patients were due to a uremia rather than to true eclampsia. Out of a total of 50 patients in our series with convulsions (40 in Table I, 4 in Table II, 5 in Table IV and 1 in Table III), we feel that we can classify 45 as typical eclampsia, i.e., 90 per cent, and we are of the opinion that the remaining 10 per cent are probably also of the same nature; if this is the case we have to deal with an eclampsia superimposed upon a chronic nephritis. This belief seems justified when one studies carefully the doubtful cases in Table IV, and when one bears in mind that in all the toxemia patients without convulsions, studied during the period under consideration, there are distinctly more than 10 per cent with permanently damaged kidneys. Moreover, while there may be signs of a moderate retention of nitrogenous material in the blood, the figures never approach the height of those observed in actual uremia.

It is not the purpose of this paper to attempt to discuss the cause of eclampsia, but it seems pertinent to know how far the kidneys may be involved in this disease. The large amount of albumin in the urine appearing rather suddenly may be due to the action of a toxin on the glomerular capillary wall, or to any factor that may change the capillary permeability, or possibly to an arterial spastic contraction, as is assumed by some authors. The high filtration pressure, as evidenced

TABLE II—ECLAMPSIA AND PRE-ECLAMPSIA, FOLLOWED BY SUBSEQUENT PREGNANCY

(Total 7 cases; 3 shown in this table.)

INDEX	AGE	PARA	PRG- NANCY	DATE	HEAD- ACHE	EDEMA	EYES	CON- VUL.	R. P. S. SYS.	R. P. D. DIAS.	URINE			BLOOD				DIAGNOSIS	REMARKS	CORRECTED DIAGNOSIS		
											Alb. Gm.	Micro- scopic	N. P. N.	Uric Acid	% N. P. N.	Urea N	CO ₂					
401	35	6	Term	9/30/21	No	++			190	100	9.0	No casts								B. P. 150/105, and albumin 3 gm. 1 week before admission	Eclampsia followed by low reserve kidney	
				10/ 1/21			1	185	100	14.0												
				10/ 2/21				220	124	18.0												
				10/ 3/21				160	100	0.75												
"	36	7	Term	10/ 9/21					152	100	0.7	Hyaline and granular casts								Delivery-manual dilatation of cervix Craniotomy Fetal heart not heard Child dead		
				10/12/21				124	80	1.0											Discharged	
				10/19/21				136	85	0.1											B. P. 155/105 and albumin +++ past two weeks	Eclampsia
				11/22/22	No	+++	No visual disturbances Narrowing of arteries		180	110	2.8		28.3									
"				11/27/22		++			162	100	0.5									Delivery Version, Extraction-Bougie Child normal		
				12/ 3/22		+	Slight retinal edema		160	94	0.2											
				12/ 5/22					170	110												
				12/ 6/22					125	70	0.6	Few granular casts	59.7	8.2								38.1
"				12/ 9/22					105	65	0.1	Granular casts										
				12/15/22					125	60	0.1	Granular casts										
																						Nephritic Toxemia
"	38	8	Term	10/31/24	No	No			154	100	1.0									Delivery Version Extraction. Admitted in labor, child stillborn In dispensary B. P. 150/90 and ++ Albumin on 10/23/24		
				11/ 1/24					156	98												
				11/ 5/24					140	85	0.2											
				11/ 6/24					132	80	0.0											
"				11/11/21					125	76	0.0	No casts										
																						Nephritic Toxemia

TABLE II—Cont'd

UNIT	AGE	PARA	PRG- MENCY	DATE	HEAD- ACHE	ED- EMA	EYES	CON- VOL.	S. P. SYS.	S. P. DIAS.	URINE	BLOOD				DIAGNOSIS	REMARKS	CORRECTED DIAGNOSIS
											Alb. Gm.	Micro- scopic	N. P. N.	Uric Acid	Urea N % N. P. N.	CO ₂		
2,692	19	1	8 mo	7/10/23 7/12/23	+	+++	Examina- tion Normal	2	166 170	100 110	12.0 18.0		45.4 46.0			45.7 38.1		Eclampsia followed by Nephritis
				7/18/23 7/23/23	No	No			145 120	100 75	5.0 Very faint trace		45.4 39.5	4.7		45.7 47.5	Gestagen Section Child premature Died 2nd Day	
				9/ 1/23	No	No			110	75	Very faint trace		58.8			55.1	Nephritic Toxemia and Con- vulsion	
"	20	2	9 mo.	3/24/25	No	++	Slight retinal edema and few hemor- rhages		200	134	2.6			5.1	29	47.9	Discharged B. P. 170/102 and ++ albu- min beginning 8th month Delivery (Forceps) Child normal Discharged	
				1/ 1/25 1/ 8/25 1/17/25 1/23/25	No No	+			172 166 118 120	130 132 40 88	0.5 1.8 0.4 0.2							
1,121	25	8	9 mo.	12/11/24 12/16/24 12/28/24 1/ 2/25 1/10/25 1/22/25	+	++			202 180 146 151 145 122	114 108 98 110 95 80	4.5 2.0 0.2 0.1	No casts Few hyaline and granular casts	29.4 30.0 39.5 37.2	1.0 6.1 4.7 4.1	50 37.5 49 40	43.3 42.4 33.8 54.8	Four previous deliveries on outside service, all normal Spontaneous Delivery Child Normal Discharged	Pre- eclampsia Toxemia followed by prob- able low reserve kidney
"	26	9	Term	5/15/25 5/25/25	No	+			130	90	0.0 0.0						Spontaneous Delivery Admitted in labor Child Normal Discharged	

TABLE III.—CHRONIC NEPHRITIS COMPLICATING PREGNANCY

(Total 7 cases, 3 shown in the table)

CASE NO.	AGE	PARA	PRG- VANCY	DATE	HEAD- ACHE	EUPHMA	EYES	CON- VUL.	B. P. SYS.	B. P. DIAS.	URINE			BLOOD				PTHAL- EIN	DIAGNOSIS	REMARKS	CORRECTED DIAGNOSIS			
											Alb. Gm.	Micro- scopic	No casts	N. P. N.	Uric Acid	Urea N % N. P. N.	CO ₂					Cl.		
25	25	1	4 mo.	11/ 4/21	No	No	Slight disturbance		175	110	1.0	No casts								First three pregnancies showed no signs of toxemia although last two resulted in miscarriages	Signs of kidney involvement early in 4th and 5th pregnancies			
				11/ 5/21	No	No	Examination. Arteries contracted		110	70	0.1													
				11/ 6/21	No	No	Examination negative		135	95	0.1	Faint trace												
				11/13/21	No	No	Examination negative		105	70														
26	26	5	6 mo.	11/14/21	No	No	Examination negative		100	70									Pre-eclamptic toxemia	Discharged	Nephritis			
				1/25/22	++	++	Examination negative		190	120	3.0	No casts												
				1/28/22	++	+			170	115	1.0													
				2/ 2/22	+				160	95	0.5													
27	27	6	5½ mo.	2/ 8/22					155	95	0.5									Nephritic toxemia	Discharged before delivery			
				2/12/22					150	100	0.3													
				2/16/22					150	100	0.3													
				6/16/23					195	130	1.0	No casts												
				6/18/23					200	130	0.5													
				6/20/23	+	No			205	140	0.5													
				6/22/23					155	110	0.6	Few granular casts												
				6/24/23					155	115	0.5													
				6/26/23			Examination negative		150	100				65.6										
				11/21/23	++	+			180	135	1.0													
				11/25/23					155	115	0.5													
				12/ 5/23	+	+++			156	102	1.0			29.7	4.2									
12/30/23		+++			140	108	1.0																	
1/ 6/24		+++			170	125	0			44.4	5.7													
1/12/24		+++			175	120	0			26.9	4.7													
1/15/24		++			170	115	0.5																	
1/28/24		+			160	110													Chronic nephritis myocarditis	Returned to hospital because of swelling of feet and legs	Syphilis of the C.N.S.	Discharged	Patient died at home 3/11/24	

TABLE III.—CONT'D

NUMBER	AGE	PARA	PREG- NANCY	DATE	HEAD- ACHE	EDVIA	EYES	CON- VUL.	B. P. SYS.	B. P. DIAS.	URINE			BLOOD				PHTHAL- MUS	DIAGNOSIS	REMARKS	CORRECTED DIAGNOSIS		
											Alb. Gm.	Micro- scopic	N. P. N.	Uric Acid	% N. P. N.	CO ₂	Cl.						
13, 513	20	1	Term	8/13/23 8/21/23 8/25/23	No No No	+ No No	Normal		130 115	85 70	2.0 0.0 0.0	No casts									Mild pre-eclampsia	Delivery normal	Signs early in 2nd pregnancy
21	2		4 mo.	3/15/24	+	++			135	90	34.0	Few casts		19.9	2.6				67		Discharged		
				3/20/24 4/7/24 4/29/24 5/15/24 5/17/24 5/26/24 6/13/24 6/22/24	++ ++ ++ ++ ++ ++ ++ ++	++ ++ ++ ++ ++ ++ ++ ++			155 140 110 135 110 135 137	100 90 85 75 80 85 94	36.0 24.0 8.0 1.0 1.0 0.3 4.0			24.3 21.8 20.1 34.5 42.8 27.3	1.7 2.4 2.7 3.4 4.2 3.4	49.2 45.1 43.5 47.1	488 554 544 544		90		Transferred to Obstetric Dept. Spontaneous miscarriage (Bougie)	Admitted to Dept. of Medicine for nephritis	Nephritis
11, 405	26	9	9 mo.	2/23/16 3/1/16 3/6/16 3/11/16	+	No No	Examination normal		170 170 170	100 95 95	1.0 0.5 0.1	No casts									Chronic nephritis	Normal delivery on 2/29/26	Higher B. P. level in 11th than in 9th pregnancy
29	10		Term	2/23/19	No	No	Normal		Normal		0.0										Nephritic toxemia	Child died on 5th day prematurity	Early signs in 12th pregnancy
31	11		9 mo.	2/23/19 2/27/21	No No	No No	Examination acute exudative retinitis		255	220	0.9								50		Normal delivery at home	Discharged	Nephritis
				2/1/21 2/11/21 2/18/21 3/2/21 3/11/21					265 185 215 190 170	220 140 110 140 120	1.0 0.4 0.9 0.2 0.0										Delivery (Bougie) Premature—living		
32	12		3 mo.	5/3/22 5/7/22 5/9/22 5/17/22 5/27/22	++	No			230	135	0.1	Granular casts		29.1			65.9	501	48		Nephritic toxemia	Discharged	
				5/7/22 5/9/22 5/17/22 5/27/22			Examination Arteriosclerosis		175 170 190 165	115 100 110 100	0.1 0.1 0.1 0.1								88		Supercapsular hysterectomy		
																					Nephritic toxemia	Discharged	

TABLE IV—ECLAMPSIA SUPERIMPOSED UPON NEPHRITIS

NUMBER	AGE	PAR- ITY	DURA- TION OF PRIG.	DATE	HEAD- ACHE	EDEMA	EYES	CON- VUL.	R. P. SYS.	R. P. DIAS.	URINE			BLOOD				REMARKS	
											Alb. Gm.	Micro- scopic casts	N. P. N	Uric Acid	% N. P. N	Urea N	CO ₂		
12,150	40	VII	Term	11/29/22	+++	+++	Dimness of vision	2	260	130	22.0	Many gran. casts	43.8				46		
13,120	34	IV	8 mos.	12/22/22	No	No			152	95	1.8		30.6	2.3			62.8		Delivery—Spontaneous
				1/7/24	++	+++	Retinal edema Retina detached	6	220	140	21.0	Many hya- line casts	34.7	4.9		40	45.3		Delivery—Spontaneous (Bougie)
10,917	26	III	Term	1/21/24	No				158	114	0.8	Occas. cast	34.9	3.7		47	45.0		Child premature stillborn
				1/30/21	No	+++		4	208	160	5.0								1st. preg. 7 convul. delv. by C. S.; 2nd, 1 convul. p.p.
				2/8/21	No	++			212	152	0.8		20.0	2.0		65	48		Delivery—Spontaneous (Bougie)
				2/25/21	No	No			140	100	0.5								Stillborn
				3/18/21	No				134	100	0.1	No casts							Transferred to medicine Discharged. diagnosis chronic nephritis
11,375	34	II	6 mos.	9/22/21	+	+++	Albuminuric retinitis	3	205	120	12.0	Many casts							Delivery—Spontaneous (Bougie and Bag) on 9-26-21.
						—													Child premature—macerated. Died p. m.; Peritonitis, subacute nephritis, begin- ning arteriosclerosis.
11,441	25	I	7 mos.	10/4/21	No	No			150	84	1.5	Many casts							Delivery—Version. Extraction (Bougie, Bag and Manual Dilatation).
				10/24/21	+++	+++		3	190	120	40.0	Many casts							Child stillborn. On 1-2-21 in dispensary, B. P. 165/100; albumin ++
				11/12/21	No	No	Slight retinal edema		95	60	1.2	No casts							

by the greatly elevated blood pressure, seems to be definitely associated with this passage of protein through the capillary wall of the glomerulus. On the other hand, the sudden return to an albumin-free urine must mean that the causative factor had functioned only temporarily, and that no permanent damage had been done to the capillary wall. This is highly suggestive of a temporary change in capillary permeability. Furthermore, the postmortem histologic findings in the eclamptic kidney suggest that there is usually no damage to the capillary walls or to the glomerulus itself. The most frequent changes are seen in the tubules and these are most probably the result and not the cause of the clinical picture. We are, therefore, led to the conclusion that eclampsia does not usually damage the kidney, but that in a small percentage of cases the eclampsia has been superimposed on a chronic nephritis.

GROUP V. LOW RESERVE KIDNEY

Table V includes a series of cases which present what we call, for lack of a better name, "low reserve kidney." From a study of these patients one is immediately struck by the following features:

1. An elevated blood pressure which at the end of the puerperium has dropped to a normal level. In most instances this elevation is not very marked, being approximately 150 systolic and 90 diastolic.

2. The amount of albumin in the urine is never very great, varying before delivery between a fraction of a gram and two grams per liter, although the lower figures are most usually observed. The albumin disappears during the puerperium, and the patient leaves the service either with no albumin at all, or with at the most 0.1 gram per liter.

3. The outstanding characteristic is the fact that in subsequent pregnancies, the patient's condition does not become aggravated, and she is as well as, or better than, in the preceding pregnancy. Each of our fourteen cases clearly demonstrates this point.

4. The blood chemistry, as well as the urine chemistry, reveals nothing abnormal.

That the number of pregnancies through which the individual may go plays any rôle in the development of this entity is very doubtful, for the reason that we observe it in primipara as well as in all degrees of multiparity. Moreover, this type of kidney does not seem to be permanently injured by pregnancy. As the woman approaches term a certain amount of albumin may pass through the glomerular membrane, the blood pressure become elevated, and some edema exist. With regard to the latter point it is interesting to note that in subsequent pregnancies there is either no edema or at the most a slighter degree than before.

It is well known that in a healthy person, under normal conditions, all of the glomeruli are not functioning at capacity at any one time, and it has been estimated that there is usually a margin of safety which approaches 50 per cent. In other words, there is a decided

TABLE V--CONT'D

NUMBER	AGE	PARA	PREG- NANCY	DATE	HEAD- ACHE	EDEMA	EYLS	CON- VUL.	B. P. SYS.	D. P. DIAS.	URINE		BLOOD				ORIGINAL DIAGNOSIS	REMARKS
											Alb. Gm.	Micro- scopic	N. P. N.	Unit Acid	% N. P. N.	CO ₂		
11,383	34	4	9½ mo	9/12/21	No	No	No visual disturbances		122	86	0.2	Few casts Hyaline and granular casts				Pre-eclamptic toxemia	Discharged	
			Term	9/28/21 10/ 3/21 10/ 8/21	No No	No No	Examination negative		140 122 136	95 84 90	0.5 0.1					Spontaneous delivery Admitted in labor		
	35	5	1½ mo	9/ 5/22	+	No			160	110	0.1	Hyaline and granular casts				Pre-eclamptic toxemia	Child normal Discharged	
				10/ 5/22 10/14/22 10/18/22 10/25/22			Examination negative		130 138 118	100 92 82	0.1 0.1	No casts				Nephritic toxemia	Spontaneous delivery Child normal Discharged	
13,517	23	1	Term	4/10/21 5/ 5/21 5/ 8/21 5/11/21 5/19/21 5/22/21	No + + + + +	++			155 160 170 160 130	95 100 120 110 85	0.1 0.0 0.1 0.0 0.1	No casts No casts Casts present Occasional granular casts				Pre-eclamptic toxemia	Hypertension and edema for past two months in dispensary Spontaneous—induced delivery Child normal	
	26	2	Term	3/11/24 3/14/24 3/26/24	No No No	No No No			150 120 116	80 70 74	0.2 0.1 0.0	No casts No casts				Pre-eclamptic toxemia	Discharged	
13,174	40	3	Term	4/ 1/22 4/ 4/22 4/11/22 4/14/22	No No No No	+			135 130 118 120	65 75 76 74	1.0 1.0 0.1	Many gran- ular casts No casts				Pre-eclamptic toxemia	Spontaneous delivery Admitted in labor Child normal Discharged	
																	Because of past history and size of child and wish of patient to have live child it was decided to do a section	
42	42	4	Term	1/ 8/24 1/10/24		+			130 135	80 80	0.2 0.1	No casts No casts	33	2.9	48	39.5	Pre-eclamptic toxemia	Child normal Discharged
		4	Term	1/15/24 1/18/24 1/25/24 1/28/24 2/10/24	No No No No No	++ ++ No			140 135 110 114	85 82 74 70	2.0 1.0 0.1 0.1	No casts No casts No casts No casts	33.3 30.0	3.9	50	40.0 41.4	Nephritic toxemia	Discharged before delivery Cesarean section done because of previous history Cesarean section—resection tubes Child normal

TABLE V—CONT'D

NUMBER	AGE	PARA	PRG- NANCY	DATE	HEAD- ACHE	EDEMA	EYES	CON- VUL.	URINE				BLOOD			ORIGINAL DIAGNOSIS	REMARKS	
									B. P. SYS.	B. P. DIAS.	Alb. Gm.	Micro- scopic	N. P. N.	Uric Acid	Urea N % N. P. N.			CO ₂
11,972	24	4	7 mo.	9/20/15	No	No			—	—	0.0					Previous pregnancies quite normal <i>Delivery normal</i>		
		5	Term	12/15/21					—	—					Normal	Delivered by obstetrical outside service of hospital Child normal, discharged		
34	34	6	9½ mo.	12/26/21 12/28/21 1/1/22 1/3/22	+++	+++	Retinal edema and few hemorrhages		204 220 185 206	128 128 128 130	0.5 0.5 0.5 1.0	No casts	24.2 23.0	4.2 3.9	33 40	48.6 39.1	On 10/21/24 an elevation of B. P. was noted in the dispensary <i>Delivery spontaneous (Poorhess bag)</i>	
				1/6/25 1/11/25			Slight retinal edema		160 138	95 90	0.1 0.1				Pre-eclamptic toxemia	Child stillborn Discharged		
35	35	7	Term	2/14/26 2/16/26 2/21/26	No	No			140 130 118	90 80 70	less than 0.1 0.0 0.0		24.0	4.0		47.	<i>Delivery spontaneous</i> B. P. 140/80 on 11/10/25 in dis- pensary Admitted in labor Child normal Discharged	
11,569	20	3	7 mo.	1/1/21 1/19/21 1/23/21 1/25/21	No	No	Examination negative		190 175 140 115	130 125 105 85	1.0 0.5 0.25 0.0	Few gran- ular casts					For past two weeks swelling of ankles and ++ albumin in dis- pensary First 2 pregnancies were premature at 6th and 8th months Discharged	
			8 mo.	2/4/21 2/6/21 2/14/21	+	No			156 136 130	100 85 95	0.1 0.1 0.0						Improved <i>Spontaneous—premature</i> Child premature Stillborn macerated Discharged	
21	21	4	8 mo.	1/6/22 1/9/22 1/14/22 1/15/22	No	No			166 141 110 110	120 100 80 80	2.0 1.0 0.5 0.1						<i>Spontaneous—premature</i> Admitted in labor Child premature, lived 1 day Discharged	
13,856	22	4	Term	6/10/21 6/20/21	No	No			130 115	85 65	1.6 0.0	No casts No casts					Pre-eclamptic toxemia	<i>Spontaneous delivery</i> Child normal Discharged
21	21	5	Term	2/17/23 3/1/23					124 120	90 80	0.1 0.1	Few gran- ular casts					Pre-eclamptic toxemia	<i>Spontaneous delivery</i> Child normal Discharged
25	25	6	Term	8/14/24 8/25/24	No	No			102	68	0.0 0.0	No casts No casts					Normal	<i>Spontaneous delivery</i> Child normal Discharged

NOTE.—There are 6 more patients (hospital numbers 11,317, 11,954, 13,908, 13,946, 13,985 and 14,134), not shown in this table because of lack of space. They all had a pregnancy with low reserve kidney, practically almost identical with the above, and followed by a subsequent normal pregnancy in which there was no sign of any form of toxemia.

kidney reserve which may be called into play. It seems reasonable to suppose that in certain individuals this kidney reserve may be greatly decreased, due either to congenital causes or to such factors as may have lessened the number of functioning glomeruli without producing a chronic nephritis. As we have seen in another group of cases, the strain of pregnancy always aggravates a chronic nephritis, so that later the kidneys are less well prepared to stand the strain of subsequent pregnancies. In the type of kidney under consideration this is not the case. All we can say is that the kidney reserve seems to be too low to meet the extra demands of pregnancy, as is manifested by the passage of a certain amount of albumin through the glomerular epithelium and by a moderate elevation of blood pressure, and that these manifestations usually disappear completely within two weeks after delivery. Furthermore, the kidney substance does not seem to have been injured by the pregnancy and the kidney reserve is certainly not lower for subsequent pregnancies. Such kidneys appear to be quite capable of functioning adequately while the woman is not pregnant, as well as for her and her fetus up to about the eighth month of pregnancy, when manifestations of the low reserve kidney begin to make their appearance.

In addition to the eight cases reported in Table V, we have been able to find six more patients who, during the period studied, had had a pregnancy with the typical signs and symptoms of a low reserve kidney, which was subsequently followed by a normal pregnancy. Such observations may be regarded as indisputable evidence that the occurrence of a mild toxemia in a given pregnancy is not necessarily followed by trouble in a subsequent one, and would accordingly indicate that the kidneys had not been permanently damaged.

Table II, as stated above, represents the findings in patients who have had eclampsia or pre-eclampsia, and who have been observed in subsequent pregnancies in this hospital. An examination of the results tabulated in this table will convince us that eclampsia or pre-eclampsia can be followed by eclampsia in a succeeding pregnancy, or by a low reserve kidney, as well as by definite nephritis.

The hospital records show that for the period January 1, 1923, to February 1, 1926, there were 10 eclamptic patients who were subsequently admitted to our service and that these pregnancies following typical eclampsia can be grouped as follows: (a) 4 normal pregnancies; (b) 4 complicated by nephritis; (c) 2 typical eclampsia, and (d) 1 with low reserve kidney.

One of the patients is shown in both groups (b) and (c).

Table VI represents a study of averages, and still further accentuates the differences discussed above. The similarity between eclampsia and pre-eclampsia is outstanding, and it offers conclusive evidence as to how markedly these two types differ from chronic nephritis

TABLE VI. AVERAGES

TYPE	TOTAL CASES	TOTAL ADMIS- SIONS	BLOOD PRESSURE		URINE			BLOOD					
			Systolic	Diastolic	Alb. Gm.	Urea N % T. N.	NH ₂ N % T. N.	N. P. N.	Uric Acid	Urea N % N. P. N.	Sugar	CO ₂	Chlo- rides
Eclampsia	40	41	Before delivery	183	109	9.9	67.97	9.36	6.3	41	155	37.2	523
			At discharge	116	76	0.1	75.58	6.65	4.4	39	137	52.2	504
Pre-eclampsia	2	4	Before delivery	181	112	8.0	—	—	4.7	49	—	33.8	508
			At discharge	116	77	0.1	—	—	4.1	40	—	54.8	491
Chronic nephritis	7	24	Before delivery	176	112	3.2	46.9	5.4	6.1	38	110	41.2	536
			At discharge	137	95	0.5	61.3	5.4	3.3	32	96	47.3	488
Eclampsia superimposed on chronic nephritis	5	5	Before delivery	217	132	20.0	67.9	8.0	4.9	40	—	45.65	463
			At discharge	138	91	1.1	86.4	3.0	2.66	56	—	51.73	493
Low reserve kidney	14	36	Before delivery	143	92	0.4	68.7	5.5	3.9	45	102	42.7	510
			At discharge	120	80	less than 0.1	76.5	6.15	4.0	—	72	53.6	—

and that associated with a low reserve kidney. Hardly less marked differences exist between chronic nephritis and the low reserve kidney. In this connection it may be stated that the phenolsulphonephthalein kidney test is not of very great value in a study of the toxemias of pregnancy, and it by no means constitutes a method of distinguishing between the several types.

CLASSIFICATION

From a study of the 120 admissions of patients presenting one or other type of the toxemias of pregnancy, we suggest the following classification for the late toxemias of pregnancy: (1) Eclampsia, (2) Pre-eclampsia, (3) Chronic nephritis, complicating pregnancy, (4) Eclampsia superimposed upon nephritis, and (5) Low reserve kidney. It should be clearly understood that an intelligent differential diagnosis can often not be made until the end of the third week of the puerperium. Consequently, we advise that in the borderline cases the final diagnosis be deferred until as late as possible. This is the mode of procedure in this clinic, and in the future in doubtful cases the final diagnosis will be deferred until six weeks after delivery, when the patient will be readmitted to the service and be subjected to searching clinical and chemical investigation.

CONCLUSIONS

1. *Eclampsia*.—This is a fairly definite entity. The convulsions and coma, the relatively sudden appearance of a greatly elevated blood pressure and a large amount of albumin in the urine occurring during the last third of pregnancy, but more frequently in the neighborhood of term, and the complete return to normal at the end of the puerperium constitute the usual picture. Often one sees an increase in the amount of uric acid in the blood, an elevated blood sugar, and a low CO_2 combining power associated with a large amount of ammonia in the urine, all of which rapidly disappear during the puerperium. Ophthalmoscopic examination may show a detachment or edema of the retina, but never any sign of albuminuric retinitis, or of the other changes which are so frequently associated with nephritis.

The edema of the extremities, face, and other parts of the body, which is usually present, disappears completely during the puerperium. Eclampsia is seen more frequently in the young primipara than in the multiparous woman.

There is no evidence that eclampsia per se does any permanent damage to the kidneys and, for this reason, should not be considered a counter-indication for further conception.

2. *Pre-eclampsia*.—This seems to be a definite entity and differs from eclampsia only in so far as the patient has no convulsions or coma, and that the attack may be of a milder character. Our studies seem

to indicate that this is probably the rarest variety of toxemia of pregnancy, and that its incidence will not exceed 5 per cent of all toxemic patients. Pre-eclampsia is probably just what the term implies, a stage immediately preceding eclampsia. Should the condition grow slightly worse, the patient will develop convulsions, unless pregnancy is promptly terminated.

Even casual reference to the literature makes it evident that the term "pre-eclamptic toxemia" has been very loosely used in the past. Some writers group under that designation all types of toxemias, and

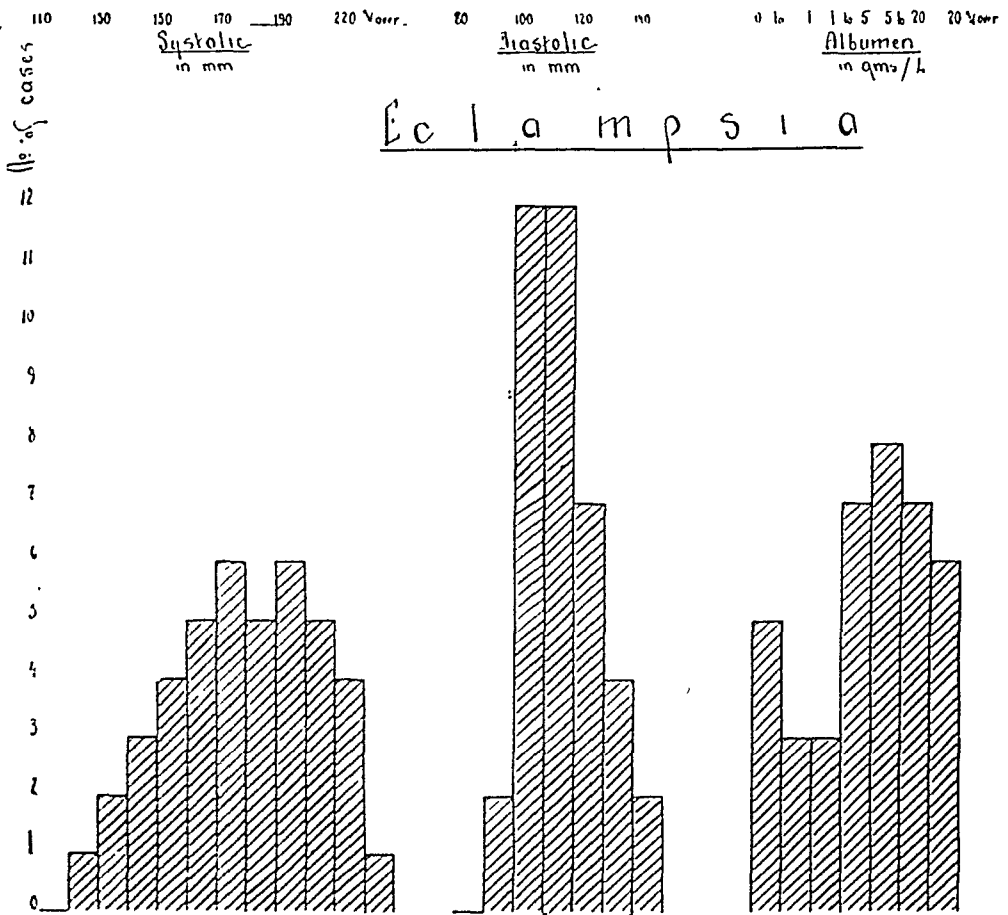


Fig. 1.

for that reason we have preferred to limit the use of the term "pre-eclampsia" or pre-eclamptic toxemia to the cases falling into the second group of our classification. Indeed, it might be well to discontinue altogether the use of the latter term, did it not imply too radical a break from current obstetric terminology.

3. Chronic Nephritis Complicating Pregnancy.—In this group the process is progressive. Each subsequent pregnancy is associated with an increasing degree of renal impairment. The existence of chronic nephritis is evidenced by the fact that two or three weeks after delivery the blood pressure still remains above the normal level. In

such cases the diastolic level is of especial value, and in the table of averages, it is noted that the patients with chronic nephritis are usually discharged with a diastolic pressure of well over 90, and in addition with about half a gram of albumin in the urine. The nitrogen partition in the urine may also be upset, together with an increase in the N.P.N. An examination of the eye-grounds may show an albuminuric retinitis and arteriosclerosis, or some other sign of involvement, such as edema or hemorrhage of the retina.

A careful study of all the data obtained during the patient's stay in the hospital, as well as at the time of discharge, will reveal some

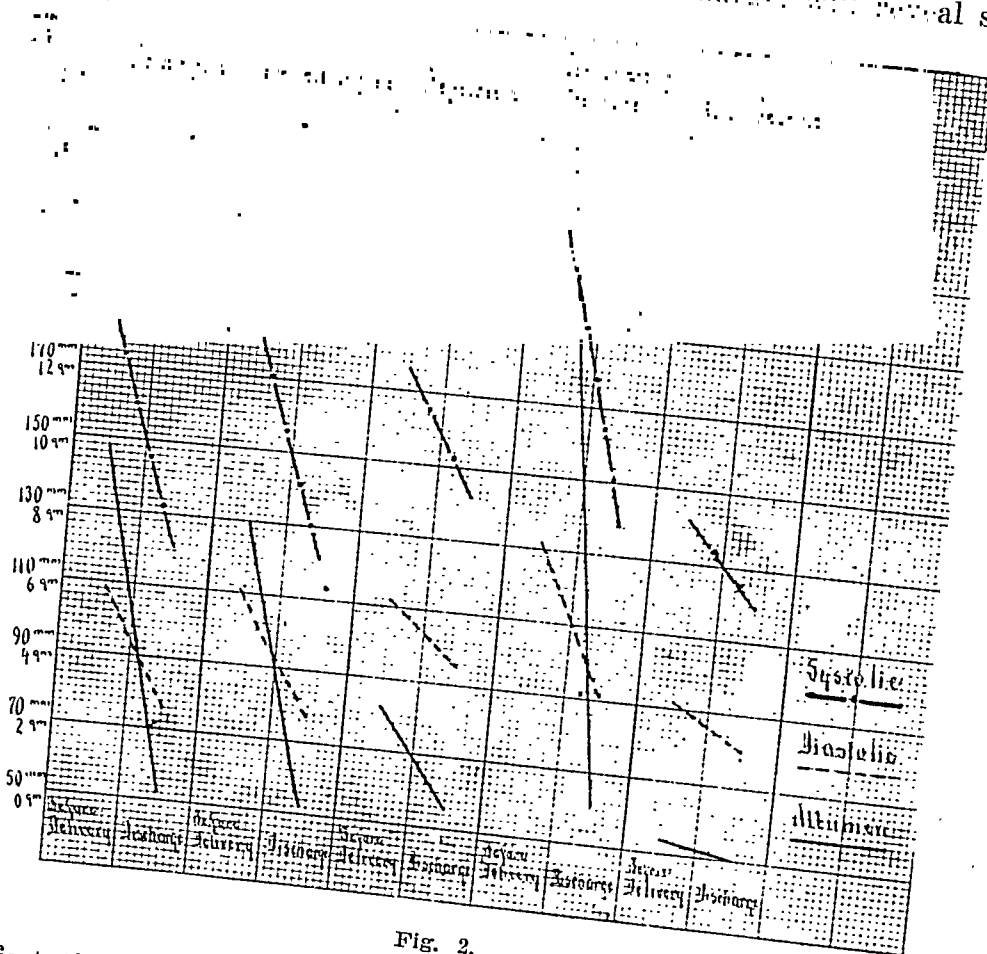


Fig. 2.

manifestation of chronic nephritis. It is of the utmost importance to remember in subsequent pregnancies these manifestations become more marked and usually appear earlier in the course of pregnancy. There is also a greater incidence of abortions and miscarriages.

In the woman with chronic nephritis, pregnancy is indeed a serious matter, as the extra load of each succeeding pregnancy leads to progressive kidney damage.

We believe that the patients who were formerly considered as suffering from "nephritic toxemia in convulsions" in reality had eclampsia superimposed upon a chronic nephritis, and that they rep-

resent only a very small proportion of all eclamptics. This statement should not be understood as implying that pregnant women may not succumb to an acute uremic attack, but no indubitable example of it has been observed in the present series.

4. *Low Reserve Kidney*.—During the last few months of pregnancy, there may appear a moderate rise of blood pressure, usually about 150/90, and relatively small amount of albumin in the urine, ranging from a fraction of a gram to a gram, to very slightly over one gram just before delivery. There may also be some edema and very rarely a complaint of headache. By the end of the puerperium the blood pressure has resumed its normal level, the urine contains no albumin, or only a faint trace, and any edema that may have been present, has disappeared. At no time are there any signs of a disturbed blood chemistry, and the nitrogen partition of the urine is normal. In subsequent pregnancies a similar picture may recur. In other cases it may be less severe, but is certainly not worse, while occasionally the patient is entirely normal.

Pregnancy does not injure this type of kidney, and when we are sure that the toxemia is due to it, we need feel no alarm concerning the course of subsequent pregnancies.

Eclampsia may be followed by a normal subsequent pregnancy, by a pregnancy complicated by a low kidney reserve, by a chronic nephritis, or rarely by a repeated attack of eclampsia.

In conclusion, we would refer to the accompanying graphs (Figs. 1 and 2) in which we have plotted the average systolic and diastolic blood pressures, as well as the albumin in the urine for the various groups. Two values for each variable are recorded, the first referring to the findings before delivery, and the second to those at discharge. We feel that this graphic demonstration illustrates the difference between the several toxemic types even better than our description or than the figures in the various tables.

REPORT OF A CASE OF ACTINOMYCOSIS OF THE TUBES AND OVARIES*

BY JOSEPH W. DRAPER, M.D., AND W. E. STUDDIFORD, JR., M.D.
NEW YORK, N. Y.

(From the Department of Pathology, Columbia University, and the Sloane Hospital for Women)

THE literature on actinomycosis of the female pelvic organs has been reviewed by several writers and all of them have come to the conclusion that the vast majority^{1, 2} of such cases are secondary to intestinal infection, and that primary pelvic infections are extremely rare, some even questioning their existence.³ The following is the report of a case which was at first thought to be primary in the pelvic organs.

The patient, white, age thirty-six, gravida iii, entered Sloane Hospital on December 12, 1923. Her complaint was "abdominal pain for three weeks" which had become more severe in the past eight hours. She stated that she had been awakened by intense pain in the region of the rectum and vagina on the morning of admission. She had been wearing a "womb protector" of the wishbone type for the past three years, which had been inserted by a midwife and was removed every three months for cleansing. The patient stated that she had never been outside of New York City. Her last menstrual period was nine days before admission and was normal. She had had three normal pregnancies, the last in 1919. The deliveries were uneventful.

On admission her temperature was 103° F., pulse 130, respiration 26. The abdomen was slightly distended and tender in both lower quadrants. There was some rigidity in the region of the appendix.

Vaginal examination showed an enlarged, tender, adherent, retroverted uterus. There was some induration and tenderness in both fornices. WBC 13,800; 83 per cent polymorphonuclear leucocytes. Wassermann reaction negative. Blood pressure was 110/60. Urine and blood cultures were sterile. Urine examination was negative. The tentative diagnosis was bilateral parametritis and an adherent retroversion.

For the next nine days the patient ran an irregular temperature up to 101° F. each day. The abdominal distention lessened and a definite mass, which was thought to be an abscess, appeared in the pelvis, extending halfway to the umbilicus. Ten days after admission a posterior colpotomy was done and six ounces of yellow, foul smelling pus evacuated. Culture of the pus showed many gram-negative bacilli.

The temperature gradually subsided, the abdominal signs disappeared and the patient was discharged the twenty-second day postoperative in good condition except for the adherent retroversion.

She was readmitted on February 20, 1924, thirty-nine days later, complaining of vaginal discharge, weakness, and night "sweats" which began after a menstrual period eighteen days previously. She had vomited occasionally. On admission her

*Read before the Section of Obstetrics and Gynecology, N. Y. Academy of Medicine, October 27, 1925.

temperature was 101.2°, pulse 120, respiration 26. There was a tender mass in the upper right quadrant in the region of the gall bladder; the spleen was slightly enlarged. The lungs showed a few fine râles localized at the right apex.

Vaginal examination revealed an enlarged, retroverted, adherent uterus; the right tube and ovary were adherent high up in the pelvis. Adhesions were noted on the right side which were thought to be omental. WBC 12,000, polymorphonuclear leucocytes 69 per cent. Urine and blood pressure were normal.

X-ray and cystoscopic examinations of the kidneys were negative, likewise the gall bladder, after injection of tetrabromphthalein, and an x-ray of the lungs revealed nothing.

She ran a septic temperature to a maximum of 103° F. The mass and tenderness in the right upper quadrant persisted. There was constant profuse sweating and occasional attacks of vomiting. The white count increased gradually, the red cell count and hemoglobin dropped. She was transfused with 500 c.c. of citrated blood on two occasions.



Fig. 1.—Section of left ovary. Actinomycotic colony surrounded by leucocytes. Gram stain. Low power photomicrograph.



Fig. 2.—Section of right tube. To left are remnants of tubal epithelium. To right is an actinomycotic colony surrounded by leucocytes. Hematoxylin and eosin. Low power photomicrograph.

On April 15, 1924, fifty-five days after the second admission, an exploratory laparotomy was performed. Extensive omental adhesions to the head of the cecum and numerous adhesions between the large and small bowel at the brim of the pelvis were present. A few adhesions were found between the liver and the gall bladder, no stones were palpated, and the gall bladder was emptied easily. The kidneys were normal. The adhesions between the omentum and the head of the cecum were dissected free and, in doing so, a small abscess cavity was opened adjacent to the head of the cecum, and a few drops of yellowish fluid escaped. Culture of this fluid was sterile.

The appendix was adherent at its tip to the brim of the pelvis. The left tube and ovary were the site of a tuboovarian abscess. The right tube and ovary were chronically inflamed and enlarged and showed extensive perisalpingitis and oophor-

itis. The uterus was retroverted, small, firm and bound down by adhesions on every side.

In the small bowel, 6 inches proximal to the ileocecal valve, was a rounded, indurated area 3 centimeters in diameter. It constricted the lumen of the bowel in a small degree. In the parietal peritoneum, in the line of incision, was a small, indurated nodule about 3 centimeters in diameter, which was removed. Both of these areas were interpreted as chronic inflammatory tissue. A complete hysterectomy, bilateral salpingo-oophorectomy, and appendectomy were done in the usual manner. The patient left the table in fair condition. The postoperative diagnosis was tuberculous salpingitis.

The fourth day postoperative the temperature rose to 103° F. There was a small infection at the lower end of the incision, a culture of which showed many gram-negative bacilli. This was irrigated with weak iodine solution. The blood count on the eleventh day postoperative showed 3,250,000 red cells; hemoglobin



Fig. 3.—Section of omentum. Small sinus containing actinomycotic colonies surrounded by leucocytes. Hematoxylin and eosin. Low power photomicrograph.

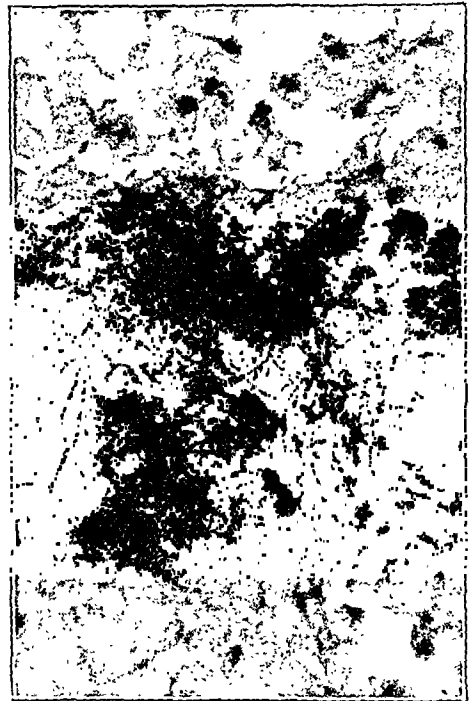


Fig. 4.—Mass of mycelial filaments found in smear taken antemortem from sinus in abdominal wall. Gram stain. Oil immersion photomicrograph.

52 per cent; 25,500 white cells, and 85 per cent polymorphonuclear leucocytes. The patient was transfused with 500 c.c. of whole blood. A cystitis, which showed colon bacillus on culture, developed the second week postoperative. This was treated by daily boric acid irrigations. The septic temperature still continued with frequent chills and profuse diaphoresis. Repeated blood cultures were negative.

After the report of actinomycosis by the pathologist, potassium iodide was administered by mouth until, on the fourteenth day postoperative, 300 gr. a day were given, the iodides were discontinued for two days each week, as a precautionary measure, although the patient never showed signs of iodism. On the twenty-fourth day postoperative a tender, fluctuating swelling 6 centimeters in diameter appeared in the right midscapular line at the costal margin. This was thought to be a perirenal abscess. Two days later a rounded, tender, firm mass could be felt extending downward four fingers breadth below the right costal margin.

On the thirty-sixth day following the complete hysterectomy, the perirenal abscess was incised and drained and a large amount of thick green pus with a colon odor was evacuated. Culture from this showed a large number of colon bacilli. Smear showed a few mycelial filaments. (Fig. 4.) Blood count following this operation showed 2,660,000 red cells; 45 per cent hemoglobin; 22,600 leucocytes with 86 per cent polymorphonuclear leucocytes. A transfusion of 300 c.c. of whole blood was given at this time. The abscess cavity was irrigated daily with weak iodine solution. The mass under the right costal margin began to extend downward and to the left.

On the fifty-seventh day postoperative a pleuritic rub developed at the base of the right lung posteriorly. She soon afterward developed a swelling over the right upper incisor tooth which broke down and discharged a yellow pus. Smear of



Fig. 5.—Section of liver. Enormous actinomycotic colony surrounded by leucocytes. Hematoxylin and eosin. Low power photomicrograph.

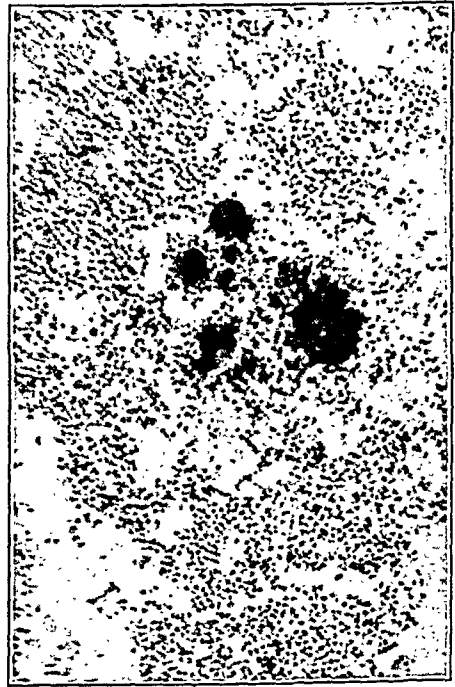


Fig. 6.—Section of mesenteric lymph nodes. Several small actinomycotic colonies surrounded by leucocytes. Hematoxylin and eosin. Low power photomicrograph.

this showed no actinomyces. The septic temperature continued throughout the course with a maximum rise to 104° F. The pulse varied between 120 and 150. Râles appeared at the bases of both lungs posteriorly.

The seventy-eighth day postoperative the blood count showed 1,480,000 red cells and 24 per cent hemoglobin. She was transfused with 450 c.c. of citrated blood. Her abdomen became greatly distended, a persistent cough developed, the patient became weaker and died on the eightieth day postoperative.

The specimen removed at the operation on April 15, 1924, consisted of the uterus, both tubes, both ovaries, a piece of omentum, a piece of parietal peritoneum and the appendix. The uterus was smaller than normal and nothing was noted except the adhesions on the posterior surface. Both tubes were enlarged, thickened, and

noted quite often in abdominal actinomycosis. Some writers explain it by stating that some small acute lesion, necessary for the passage of the organism through the mucosa, heals and leaves no trace; others state that the organism can pass the mucosa without a lesion. The actinomyces, once having gained the connective tissue planes, set up their characteristic process and spread by the direct invasion of contiguous structures.

The frequency with which abdominal actinomycosis is situated in the right iliac fossa is said to depend on a relation to the cecum and appendix. It is claimed that the latter organ occupies the same position in relation to abdominal actinomycosis as the carious tooth does to the cervicofacial type of the disease. It is frequently affected by trauma and inflammation, the consequent breaks in the mucous membrane allowing the actinomyces, if present, to pass to the subperitoneal tissues and set up a chronic abdominal actinomycosis.⁴ The appendix in this case showed an obliterative process as definite evidence of previous inflammation, although no history of appendicitis was obtained.

In closing it is worth while calling attention to the mesenteric lymph nodes. Writers on this disease are practically unanimous in stating that spreading of the process takes place by direct extension and, occasionally in the late stages, by the blood stream. The statement occurs repeatedly that extension never takes place by lymphatics and that the lymph nodes are never involved.⁵ This is often given as a differential point between this disease, malignancy, and tuberculosis. Only one case could be found in the recent literature in which definite lymph node involvement was described.⁶ It is, therefore, interesting to note that the mesenteric lymph nodes in this case showed definite actinomycotic abscesses.

REFERENCES

- ¹Robinson: Surg., Gynec. and Obst., 1919, xxix, 569.
- ²Helwig: Surg., Gynec. and Obst., 1925, xl, 502.
- ³Leith: Brit. Med. Jour., 1909, i, 844.
- ⁴Brockman: Brit. Jour. Surg., 1923, x, 456.
- ⁵Colebrook: Lancet, 1921, i, 893.
- ⁶Brickner: Ann. Surg., 1925, lxxxi, 343.

850 PARK AVENUE.

(For discussion see page 701.)

DIVERTICULITIS OF THE COLON*

BY JOHN F. ERDMANN, M.D., NEW YORK CITY

(From the Department of Surgery, New York Post-Graduate Medical School and Hospital)

LEFT lower quadrant pain with nausea or vomiting in the male predicates diverticulitis of the sigmoid, while in the female, in whom this disease is of relative infrequency compared to the male, the same situation of pain may mean any one of numerous diseases.

In 1919 I presented a record of twenty-seven patients operated upon for acute diverticulitis, and today record twenty-five more, making fifty-two operated upon, of which forty-two were males and ten were females. Carnial stated that there are two or three males to every female case. Of my series, two had had multiple attacks. One had had two distinct perforations during a period of thirteen or more years, for each of which he was operated upon; the other had had two attacks, for which he had been operated upon, in a period of less than three years. The gangrenous perforations in each patient were in demonstrably different areas.

Attention was called to the possibilities of repeated attacks in a paper read by me before the Buffalo Academy of Medicine, Surgical Section, on January 8, 1918, and published in the *New York Medical Journal* for June 7, 1919. My associate, Dr. Thomas Russell, also has found a second perforation in one of his patients, remote from the first attack.

These succeeding gangrenous attacks will of necessity call for a very guarded prognosis as to the future. Prompted by the number of patients I have seen and operated upon for the acute condition, I feel no need of apologizing for again reviewing the literature as to causation and expressing my individual views derived from clinical observations.

Causation:—Much has been said as to the origin or cause of these protrusions. In searching for a reasonable cause for diverticulitis of the intestine, I am led to cite Edwin Beer's excellent paper in the *American Journal of the Medical Sciences*, 1904, entitled "Some Pathological and Clinical Aspects of Acquired Diverticulitis of the Intestines." This paper stands out as one of the best expositions as to cause, etc., of this disease. It is furthermore remarkable with what foresight Beer at that time announced his hypotheses as to the terminations. Among the contributors to the pathology, causation, etc., may be cited Graeser, Sudsky, Klebs, Hartwell and Cecil.

Graeser assigns the cause of the formation of diverticula to hernial protrusions which follow the emerging veins and after taking a wandering course through the intestinal walls finally reach the serosa. These conclusions were based upon twenty-eight cases from which he made over one thousand sections.

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons held at Hot Springs, Va., September 16, 17 and 18, 1925.

Sudsky made a series of observations, contending that those of Graeser were at fault, being chiefly accidental.

Klebs noted that the protrusions occurred in close relation to points of exit and entry of the blood vessels in the intestine along the mesenteric attachment, and offered a series of arguments for these protrusions, chief among them being that the intestinal wall is weakest at the mesenteric attachment.

I am satisfied that the argument of Klebs is fallacious for in my series of patients, both those operated upon and those in whom these protrusions are found, inactive, while operating for other causes, the most frequent site is that of the convex and lateral aspects of the colon, chiefly in the fat lobules or epiploons, and rarely found in the mesenteric folds. Further, Klebs' view of mesenteric traction acting as a tendency to weaken the wall, thereby being a productive factor, appears to me to bear little weight. Old age as a factor is disproved by Ashurst's patient, a boy of seven, two patients of Hartwell and Cecil aged seven and ten years, one of my own, a boy under seven years and a number of the patients used as material for this article, under forty. Ransahoff, in *Annals of Surgery* (1913) reports the occurrence in two children, and called the condition perforating sigmoiditis and perisigmoiditis.

Finally, Hartwell and Cecil in summing up the etiology of this disease, after considering the various theories and arguments, apparently were forced to make the following statement. "We therefore are driven to the conclusion that up to the present time no complete explanation of the primary cause of intestinal diverticula has been offered. The most that can be said is that for some cause, a weakness exists in the intestinal coats, and that by reason of the weakness a pouching of the coats takes place when undue pressure arrives." I am inclined from my clinical experience and from x-ray observation to the conclusion that they are of congenital origin.

Reference to the literature and my own observation produce sufficient evidence of the fact that the entire alimentary tract from the esophagus to and through the rectum is liable to diverticula. During the past four years, I have operated upon several patients with diverticula; two duodenal, one gastric, two or three of the gall bladder, and several of the appendix; one of the appendiceal operations was on a child under seven years of age. Also several instances have been observed, during various abdominal operations, of diverticula scattered through the lesser intestine.

In the patients with acute manifestations, some food or fecal content is often found in the pouch involved, leading one to believe that these foreign bodies act in the same productive manner as do the foreign bodies that are found in the appendix.

Diverticulosis today is a well established disease, at least roentgenologically if not symptomatically or clinically, and requires but the onset of a pathologic process of one or more of the protrusions to become a definite clinical entity.

Classification.—While various classifications as to false and true, acquired and congenital have been in vogue, that of true in which all coats of the intestines are present and the false when one and usually two coats are absent, are the most popular and desirable for a working basis.

Pathology.—The pathologic conditions found may be the same varieties as we have types of appendicitis; from a simple catarrhal, better called acute, to the types of exudative and occlusive changes and of ulcerative to gangrenous and perforative evidence. These may or may not all be accompanied by or rather followed by exudative to true abscess formations and finally the acute processes may recur or never resolve and a malignant change eventually may arise. These malignancies are reported frequently enough to give some weight to the possibility of an implantation of malignancy upon a former simple inflammatory growth. Nevertheless, even though in my series of patients with this disease I have found malignancy in four or five, I cannot feel but that the malignancy is not a result of the disease but a coincident condition, reserving the thought that a malignant implantation at the site of a prolonged irritation is always possible.

In many of these patients we have a low grade of infection proceeding finally to a marked thickening and newgrowth that at first will resemble malignancy in its symptomatology as to partial or complete obstructions and by x-ray be so confusing at times so as to demand exploration for a positive diagnosis by the microscope. One of the most frequent complications in the acute types is abscess formation with adhesions to a hollow viscus and perforation. This occurs most frequently in the bladder. I have seen this complication in five patients in my operative series, and in one patient not only was the bladder perforated, but a contact portion of the sigmoid was perforated and two perforations of the ileum also were present.

Recently I saw a patient on the eleventh or twelfth day of his disease with a one-half inch perforation into the posterior wall of the bladder, passing a most foul fecal-mixed urine. On exposure by operation on the fourteenth day of his disease, two perforations in the sigmoid were in contact with the bladder perforation.

On two occasions I have seen high perforations in the rectum which produced ischiorectal abscesses, the origin of which in each, I feel satisfied, was from a gangrenous diverticulitis. Both patients had a history of sudden onset of pain with the subsequent formation of the abscess.

That nonoperative recovery takes place at times in these patients cannot be disputed any more so than in patients with appendicitis definitely evidenced by symptoms, but who also make the positive non-operative recovery. During the past three weeks, I removed ten inches of the sigmoid in a male, fifty-four years of age, whom I saw three years before in an acute but subsiding attack and who has been seen at various times during these three years by his family physician for mild attacks. His fourth attack which required operation was followed by a large mass formation in the left lower quadrant, encroaching upon the hypogastric zone, and upon exposure not only was a marked amount

of thickening and obstruction evident, but three large pockets of foul pus were evacuated.

Symptomatology.—Formerly we were led to believe that we had an appendicular attack in the left side due to the terminal portion of the appendix extending across the left, or that there was a transposition of the appendix with infection. While these cases—particularly of the former type—do occur, for years we have been able to definitely diagnose in the greater number of instances these involvements as diverticula.

The symptoms and signs are allied to the various types of appendicitis, such as the fulminating, where pain in the left lower quadrant rapidly spreads over the abdomen, the pulse and temperature keeping pace with the invasion, abscess formation as in appendicular abscess, definite pain on pressure, and finally mass or tumor formation. Eventually, if not operated upon, the following terminations are in order: resolution (rare); perforation into a surrounding viscus (the bladder most frequently); ischiorectal abscess and, in the event of nonresolution or nonoperative interference, thickening of the gut wall and surrounding fat takes place so that obstruction of varying degrees results.

In the fulminating type, it may be that one must hide himself in the diagnosis of "an acute abdomen" and explore. The diagnosis in women, as before stated, is difficult at times, owing to the presence of the tube and ovary and many diseases of these two structures which are very much allied in their symptomatology to acute diverticulitis.

In the subacute variety, we often have a state of subsidence which enables the x-ray diagnostician to help us out. In the very low grade type with marked infiltration, the patient presents the occasional evidence of obstruction in mild or incomplete form with no evidence of blood or mucus as in carcinoma. With proctoscope up to its length one can eliminate carcinoma at least in those patients in whom carcinoma starts in the mucosa, recognizing the fact that a very minimal number of cancers of the sigmoid or colon ever arise outside of the mucosa. Nevertheless, I have no recollection of ever having seen the mucosa of the colon involved in a case of diverticulitis. The opposite obtains in malignancy. I can think of no more difficult bit of work than that of seeing through a proctoscope the openings of very many of these diverticula, yet can conceive of the accidental exposure of a relatively small opening or of the opening into a large diverticulum in which the mouth is also large.

Diagnosis.—In making a diagnosis of this condition, the general aspect, age, etc., of the patients are to be considered. We find the majority of these patients are short, stocky beings, well nourished and of the overweight make-up, usually in the fourth or fifth decade, and giving a history of some dietary indiscretion as is also so often

noted in taking a careful history of appendicitis. The youngest of my patients was under seven years and the oldest eighty-one, both male, while the majority were forty to forty-eight years of age.

The onset symptoms are pain in the abdomen, which is more definitely located, early, in the left lower quadrant than is the case in appendicitis. There is nausea or vomiting, temperature and pulse rapidly ascending in the scale with the concomitant tenderness on pressure in the left lower quadrant varying from the usual iliac fossa area to the midhypogastric zone. The blood examination gives the typical picture of an acute infection. Rectal evidence will vary as to the site of the involvement. If the lesion is high up in the sigmoid, little or none is present, while if located in the lower segment of the colon, ample evidence can be detected, being chiefly pain the first few hours and then a palpable mass. Again if the area involved be in the midsigmoid area, sufficient mobility being present, one may get the evidence by combined rectal and suprapubic pressure.

The greatest difficulty in making a positive diagnosis prevails in cases of perforated malignancies for in these patients, owing to the perforation, we have an absorption or infection temperature and a tumor or mass in both the malignancy and the infection case. A carefully taken history will often bring to light in the carcinoma patient, evidence of occasional pain, colic, constipation, loss in weight, blood or mucus in stool, etc., and may show by blood examination a distinct secondary anemia. When possible to use without danger to the patient, the x-ray will frequently be a great aid, bearing in mind the possibilities of both diseases being simultaneously present.

Gross Pathology.—Upon opening the abdomen, the picture of the intensity of the process varies; noninflamed diverticula are seen protruding from all or rather any surface of the gut. They are bleb-like, resistant to the sense of touch, and may or may not present evidence of foreign body content.

The acutely inflamed variety varies from a markedly injected diverticulum or epiploon to one distinctly gangrenous. In the majority of patients operated upon by me, one or more of the epiploons were found involved. These tabs of fat, epiploon, were either extremely hard and intensely injected or in varying stages from hemorrhagic to gangrenous involvement. On section of the epiploon near its base or at the base, a diverticulum is usually found. These bodies or pouches are round or oval and range from the size of a small seed to that of an olive, usually about the size of a pea.

The resected colon when opened, presents the appearance of a healthy mucous membrane thrown into folds and here and there a crypt or long opening into which probes of varying size may be introduced, some openings readily admitting a probe the size of a pea. In various ones of these pouches, round foreign bodies are present which

prove to be fecal concretions. The wall of the colon in chronic cases is thickened, the lumen is diminished, and the intestine quite frequently densely bound to adjacent structures.

McGrath has shown that the majority of the diverticula are of the false variety and that the mucosa is pushed through the muscularis in the region of the penetration of vessels. In sharp contrast to this picture is that of the colon on section in cases of malignancy. The mucous membrane is destroyed. A deeply excavated area in the intestinal wall exists with hardening of the tissue about it, and the lumen is irregularly compressed by the growth if not completely annular; if annular, the opening is diminished as the growth increases, very similarly to the closing of the diaphragm in a camera. The intestine contains a sloughing, foul smelling, bloody material. In the cases (diverticulitis) reported, two were of the cecum, one in the vicinity of the ileocecal valve, and one at the beginning of the ascending colon.

I will again call attention to the statement and fact that operation does not predicate a clean bill of health from the disease as in one instance over fifty diverticula were demonstrated by me in five inches of a section of sigmoid removed for cancer, while in all the other patients in whom careful search was made numbers of diverticula were found not involved by inflammation. Two of my patients previously recorded, having definite attacks and being operated upon the second time, are also nondeniable evidence of the possibilities of repeated attacks of this disease. A guarded prognosis as to recurrence is naturally necessary. These two make a 4 per cent record of repeated invasions in my series. Some of the earlier reports of long cures of cancer by resection must be taken less seriously at the present time and considered as diverticulitis cases. I can plead guilty to reporting one such patient, a female operated upon by me sixteen years ago, 1909, for obstruction supposedly due to carcinoma. The entire pelvis was filled with a hard nodular mass, no temperature and a complete obstruction existed. A sigmoidostomy was done. In the course of two years all movements were by the rectum except slight leakage through the now contracted sigmoid anus. This patient is reported well and hearty as late as March, 1925.

Prognosis.—In the acute cases with early operation the prognosis is good, while in the chronic with resection, it is equal to that of all ordinary large intestinal operations of approximately the same severity.

Treatment.—The acute condition of the abdomen presents but one solution to me in all patients where no cardiac or renal contraindication exists, and that is early operation. One should no more wait for resolution in an abdomen in the acute type of this disease than in an allied condition due to appendicitis, pus tubes, etc.

The habit that some operators fall into of waiting and iceboxing their patients in the acute abdominal cases may bring about the occasional good result, but most frequently the results show the evidence of pernicious or ignorant delay or evidences of poor observation. Personally I have never seen the bad results reported in not delaying operation for the acute pus tube any more than I have for the acute appendix cases or in ruptured tubal pregnancies, etc., and heartily condemn delay and applaud early action of the surgical variety. Where one has the chronic type to contend with, no hurry is demanded as these cases rarely become positively obstructed but often become partially so. Here overactivity may be subjugated to treatment, dietetic, etc., and it has been shown that instead of a resection, at times an artificial anus proximal to the obstruction will work wonders in allowing absorption to take place in the thickened portion, so that eventually the channel has almost reached normalcy, whereas in other instances, resection of a portion will be necessary. This is frequently best done and with the lowest mortality of all operations by the Mikulicz procedure.

End to end suture has a greater life hazard than the former operation, while the side to side anastomosis type of operation is practiced only in certain cases.

To return to the acute cases, we have several types to consider in the early acute state. In those cases in which mass formation has not occurred, attempts at repair of the perforation are in order and meet with great success; in the acute cases, where abscess exists, liberal drainage and attempts at repair are indicated when feasible, otherwise liberal drainage only.

A fair proportion of these two varieties of cases after operation may and will present a fistula for a few weeks or months. The fistula is invariably a small caliber one and is easily taken care of and need cause no alarm, for healing is the rule. Several of my patients have gone about a few weeks—one for four years—and eventually all healed. During this time, i.e., between the establishment and cure of the fistula, only an occasional visit to the surgeon, to attend to granulations, is necessary.

In the acute variety, which is situated between the plates of the peritoneum in the mesentery, it has been my custom for several years to split the peritoneum on both sides parallel to the vessels so that freer drainage will occur from the fat of the mesentery and that most vicious type of absorption, a retroperitoneal lymphatic, is diminished.

SUMMARY

Diverticulitis is a disease of the left lower quadrant usually, but may occur anywhere along the length of the colon.

It occurs chiefly in males between forty and fifty years of age, but attacks in children are reported also.

The patients are usually of the well-developed make-up, short, fat, and overweight.

About one female to four or five males has this disease.

All acute cases should be operated upon, although it is known that subsidence and cure of attacks occasionally takes place as in other infective processes.

All chronic cases may be observed until obstructive symptoms show.

The presence of diverticula in the intestine merits no greater attention than does the existence of the appendix or gall bladder, except that there may be many diverticula, but there is only one appendix and one gall bladder; therefore, ordinarily the chance of acute diverticulitis would be greater, but clinical evidence shows that diverticulitis is by far rarer than disease of gall bladder or appendix.

50 WEST FIFTY-SECOND STREET.

(For discussion see page 682.)

OVIDUCT INSUFFLATION, BASED ON A STUDY OF 400 CASES*

By A. J. RONGY, M.D., NEW YORK, N. Y.

INSUFFLATION of the oviducts is now utilized as a routine measure to establish definitely their patency. Rubin and those who followed him have developed the technic of this procedure so that now it can be carried out safely in any well organized gynecologic office.

I have not undertaken this examination in my office; the patients were referred to the hospital, because I felt that in case they required emergency treatment it could best be given in a hospital. In some patients, even when the quantity of carbon dioxide used is small, the pain in the shoulder and the cramps in the abdomen may become so severe that it may be necessary to put them to bed.

I do not consider the examination complete unless the patient is fluoroscoped, so that the gas can be visualized in the abdominal cavity. The fluoroscopic examination not infrequently is the deciding factor. Occasionally the quantity of gas which escapes through the tubes is so small that it hardly produces any symptoms, but upon fluoroscopy gas is seen under the diaphragm.

I usually make this examination about seven days after menstruation, because at that time the genital tract is least congested and there is a greater chance for the gas to pass through without causing disturbance.

Pain and tenderness in the pelvic region are distinct contraindications for this examination. Most of the complications which take

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons held at Hot Springs, Va., September 16, 17 and 18, 1925.

place as a result of this procedure are in the main due to carelessness in the selection of cases.

Patients who suffer from severe leucorrhea should be carefully cleansed, and if necessary the cervix should be aspirated before they are insufflated.

Patients who suffer from extreme obesity and cardiac disease are not fit subjects for this examination, as they are likely to develop syncope, and their lives may be endangered. One of our patients developed such severe syncope that we thought death was imminent.

Extremely sensitive patients are best managed when given some sedative, preferably morphine, an hour or two before the examination.

A negative result does not prove conclusively that the oviducts are closed. Some patients develop a spasmodic condition of the uterus and tubes, which prevents the gas from passing through. Increasing the pressure of the gas does not relieve the condition; on the contrary, it is likely to produce greater spasm.

The examination is best done in the semirecumbent position, for this obviates an extreme change in the position of the patient and the pain in the shoulder is therefore less sudden.

The position of the uterus should always be ascertained first, so that the cannula may be properly directed. Patients who suffer from extreme retroversion may require a greater amount of pressure to overcome the resistance caused by the anomalous position.

An assistant should listen with a stethoscope over the lower part of the abdomen, to ascertain whether the gas is passing into the abdominal cavity, and also whether the gas is passing through one or both tubes. The passage of the gas through the tubes produces a characteristic sound, and one who is familiar with it seldom mistakes it. In patients with intramural fibroids, involving one of the fallopian tubes, which one of the tubes is obstructed can usually be elicited by localizing the sound produced by the escaping gas.

Oviduct insufflation has helped to crystallize further our knowledge of sterility in women. We are now in a better position to discard the mechanical conception of sterility. The cutting operations on the cervix or the insertion of intracervical stem pessaries not only fail to cure sterility, but I am certain that they cause permanent sterility in a great number of patients.

In this series, 182 women who suffered from primary sterility, had been subjected to some form of surgical operation, usually upon the cervix. Some had had plastic operation on the oviducts. I believe it cannot be emphasized too strongly that operation upon the cervical canal seldom cures sterility. It seems to me that the newer conceptions of the etiology of primary sterility would help to eliminate many of the theories founded upon its mechanical origin.

Formerly, when we were groping in the dark, there might have

been a justifiable reason in some cases to attempt to correct any apparent mechanical deformity of the cervix. Now that the patency of the genital tract can be definitely established, there is surely no justification for any operative procedure on the cervix in order to cure sterility. It seems paradoxical to ascribe the cause of sterility to mechanical obstruction of the uterine canal, when a No. 6 Holzman cannula can be introduced easily into the uterus.

When the cervix is plugged by a profuse discharge, which may act as a barrier to the passage of spermatozoa, it cannot be cured by cutting and stitching of the cervix. Such a pathologic condition requires a different form of treatment. We have now at our command a method of treatment, which practically cures endocervical infections, without actual surgical interference.

Oviduct insufflation very often aids in a more complete diagnosis, especially in deciding upon the plan of treatment, which is to be recommended in fibroid tumors of the uterus. If upon the examination of these patients the fallopian tubes are found patent, they should not be advised to have the tumors removed; perhaps they may become pregnant. Excepted, however, are those patients in whom one is certain that a myomectomy can be performed without disturbing the continuity of the genital tract. If the oviducts are found closed and the tumors produce symptoms, they can safely be advised to have the growths removed, because the question of pregnancy can be entirely eliminated from consideration in such patients.

Oviduct insufflation has helped to evaluate properly the plastic operations on the fallopian tubes for the cure of sterility. We have now the means of checking up the result of these operations. We can definitely ascertain whether the tubes remain patent subsequent to the operation.

Plastic operations on the fallopian tubes for the cure of sterility have proved unsuccessful in the greater number of instances, although this may seem contrary to some of the more enthusiastic reports. We have followed our patients who had such operations, very closely, and with the exception of three they remained sterile and upon examination the tubes were found closed. We also had occasion to examine a number of patients who had been operated upon by other gynecologists, and the results were found to be the same.

Patients who for some reason have had a unilateral salpingectomy, especially those who have had one tube removed for extrauterine pregnancy, very often suffer from relative sterility. Formerly we could only surmise the reason for the sterility. Now we are able to establish definitely the cause of the sterility in some of those patients, for not infrequently the remaining tube is found closed.

Insufflation of the fallopian tubes is not of great value where the

sterility is of constitutional origin. In nearly all of these cases the tubes are found patent; the gas passes through into the abdomen easily. It seems to me that, unless an old infection is suspected, it is hardly necessary to subject them to this examination.

Patients who suffer from relative sterility should have the tubes tested for patency, because they may have had an insidious infection as a result of labor or miscarriage, which has caused the tubes to close, and it is well that this fact be definitely established.

The usefulness of oviduct insufflation as a therapeutic measure, in either primary or relative sterility, is as yet conjectural. We had a number of patients who never menstruated after the examination, but we do not know whether these patients were pregnant at the time of the insufflation or where it was a mere coincidence that pregnancy ensued. It seems logical, however, to assume that kinking of the tubes may be corrected by the forcible passage of gas through them. Again it is not reasonable to suppose that kinking may be present in both tubes.

Insufflation of the tubes occasionally is of value during an operation on the pelvic organs through the abdomen. At times it is difficult to decide whether or not the tubes are patent. Under such circumstances it is better to have the tubes insufflated than to try to establish patency by passing a fine probe through the fimbriated extremity. The introduction of any instrument, no matter how fine it may be, or even the passage of a silkworm gut thread through the tubal canal, is likely to traumatize some portion of the endothelial coat. The passing of gas is harmless and is readily seen by the naked eye.

From December, 1920, to June, 1925, we did 400 oviduct insufflations at the Lebanon Hospital under rigid aseptic precautions. I was assisted by my associates, either Dr. Rosenfeld or Dr. Goodfriend. Patients who suffered from cervical discharge were given preliminary treatment to diminish the leucorrhea. Seldom did we subject a patient to this examination when a local infection was evident.

The average age of the patients was 27.4 years, the youngest being 22, the oldest 41 years of age. The average time of marriage was 6.45 years. The average time of marriage in 257 cases, who suffered from primary sterility, was 4.3 years. The tubes were found patent in 225 cases. Thirty-three patients were reexamined, and in all but two cases the tubes were found closed. One was a woman who was sterile for eight years, and on the first examination the tubes were found closed; she gave no evidence either clinically or by fluoroscope of the gas having entered the abdominal cavity. Three months later she was reexamined and the tubes were found patent. She subsequently became pregnant and gave birth to two children during a period of thirty-one months. We have no explanation to offer for

the different findings in the two examinations. The pressure used in both instances was about the same; in fact, it was somewhat less during the second examination. Most likely regeneration of the tubal structures took place and the points of obstruction along the canals disappeared.

Ninety-nine patients who suffered from primary sterility had severe menstrual disturbance; the flow was scanty and of short duration. They menstruated irregularly, at intervals of from six to eighteen weeks. In all of these cases the tubes were found patent. This type of sterility is of constitutional origin. Whether the functional disturbance is in the genital organs, or the malfunction of the genital tract is only a local manifestation of a general constitutional disturbance, we as yet do not know. No form of medicinal treatment improves or cures this type of patient. The organic extracts proved to be valueless in the treatment of sterility.

The average rise of the mercury column in patients whose tubes were open was 131. The average rise in patients in whom the tubes were closed was 197. We seldom allow the mercury column to rise above 220.

We have as yet no means of knowing where the points of obstruction are located. If the occlusion is at the middle or distal portion of the tube, too much pressure of the gas may tear the soft parts. There is less danger of trauma if the occlusion is at the cornua of the uterus.

Occasionally pain may indicate the points of occlusion. If the maximum intensity of pain is in the inguinal regions, the probability is that occlusions are in the outer portions of the tubes. If the maximum intensity of the pain is in the middle hypogastric region, the probability is that the occlusions are at the cornual ends of the uterus and the pain is caused by overdistention of the uterus. Whenever a patient complains of great pain in the inguinal regions, we never allow the pressure to continue.

In 142 patients the tubes were found closed. Thirty-three patients were reexamined, and in three the tubes found open. The majority of these patients suffered from relative sterility and gave a history of infection, which evidently had developed insidiously as a result of childbirth or miscarriage. In some of the patients the tubes were found to be thickened; still, clinically, they could not be classified as suffering from pyosalpinx.

Our study of the relation of infection to sterility was greatly enhanced by the fact that a competent urologist was required to make a careful examination of the husband before we instituted treatment of the wife.

It is unfortunate that so many of the men had been pronounced cured of their gonorrheal infection and had been told that they could

marry with safety, when sometime later definite evidence of an infectious process was easily demonstrated.

Fourteen patients had been operated upon for ectopic pregnancy, and upon examination the remaining tube was found closed. This would seem to indicate that infection plays an important part in the etiology of extrauterine pregnancy. It may be that the mechanical irritation produced by the blood clots in the pelvic cavity and the manipulation entailed in the operation cause a reaction in the pelvis which obliterates the lumen of the remaining tube.

Three patients, in whom the oviducts were found closed, became pregnant subsequently. Since then we are guarded in our prognosis. It is difficult to state whether it was spasm of the tubes which prevented the passing of gas or whether actual obstruction existed, which disappeared later.

Nine patients suffered from intramural fibroids of the uterus. The tumors must have interrupted the continuity of the genital canal and prevented the gas from passing through.

Three patients who had been operated upon for suppurative appendicitis, the wounds having been drained, were found to have the tubes closed. The practice of some surgeons of inserting drain into the pelvis evidently produces sufficient reaction about the pelvic viscera to cause the closure of the tubal canals. Surgeons must keep this fact in mind when operating for suppurative appendicitis in unmarried women.

Patients who suffered from dysmenorrhea were not improved by the oviduct insufflation. In this respect our experience does not coincide with the experience of those who found some of these patients suffering from less pain during menstruation as a result of this examination.

In two patients, who had had plastic operations on the fallopian tubes for the cure of sterility, we attempted to insufflate the tubes during their convalescence. Our object was to prevent postoperative occlusions of the repaired tubes. We soon abandoned this procedure because it was annoying to the patient. These patients were subsequently insufflated and the tubes were found closed.

COMPLICATIONS

1. A severe infection in the right culdesac in a patient who had been operated upon for left salpingitis four years previously and for pelvic adhesions two years later. She ran a febrile course for about six weeks, and finally improved without surgical interference.

2. Patient was twenty-six years old, married four years. The tubes were found patent. One week later she began to complain of pain in the right side and lower part of the abdomen. On examination a small mass was found in the right culdesac. The infective process

extended into the posterior parametrium. She ran a mild febrile course. She remained in the hospital four weeks. It would not be at all surprising if the infection caused an occlusion of the fallopian tubes in this patient.

3. A posterior parametritis, causing severe pain in the lower part of the back, which subsided in about twelve days.

4. Severe syncope in a case of relative sterility. The patient was short, stout, and short necked. The attack was so severe that we thought death was imminent. She rallied later and was able to go home.

5. Syncope of a milder degree, which lasted about half an hour. We believe that syncope can be obviated when the quantity of gas used is small; also it is less likely to occur when carbon dioxide gas is used instead of oxygen.

We know of two deaths which took place immediately following this examination. An autopsy was performed in one of the cases, but no definite cause could be established for the cause of death.

Through the courtesy of Dr. L. M. Kahn, Attending Surgeon at Lebanon Hospital, I had the opportunity to see an extremely virulent infection of the pelvis, extending high into the abdomen, which had developed shortly after the patient had been insufflated by a well-known obstetrician in this city. A great quantity of pus was evacuated through the posterior culdesac. She had a stormy convalescence, which lasted about four weeks.

At one time we considered the possibility of carrying infection into the genital tract. We therefore took cultures of carbon dioxide gas from a cannula exactly as we would introduce the gas into a patient and found the cultures sterile.

In conclusion we wish to state that we found oviduct insufflation of great diagnostic value in patients who suffered from relative sterility or in patients in whom we suspected a chronic pelvic infection. It is a safe procedure in properly selected cases. Indiscriminate application of it will lead to many complications. The practice, pursued by many physicians, of having this examination made in an x-ray laboratory cannot be too strongly condemned. Oviduct insufflation should be done by the experienced gynecologist only.

A STUDY OF END-RESULTS OF OPERATIONS FOR UTERINE PROLAPSE AT THE WOMAN'S HOSPITAL, 1915-1925*

BY EDWARD ARTHUR BULLARD, M.D., NEW YORK, N. Y.

(*Junior Attending Surgeon*)

THIS paper is a comparative study of the end-results of the various operations for prolapse of the uterus done between 1915 and 1925 at the Woman's Hospital. There were 361 cases in this series and the operations were performed by thirty different operators. Every patient had been examined by the surgeon who operated upon her or by some other member of the visiting staff at least once since her operation, and a large majority of them (about 90 per cent) have been observed several years in our Follow-up Clinics.

Though I have attempted to study only the results of the operative treatment of prolapse, it may be of casual interest to record that the major preoperative symptoms in this series were backache and dragging sensations in the pelvis; 58 per cent of the patients complained of the dragging sensations, and 54 per cent complained of backache.

TABLE I
OPERATIONS FOR UTERINE PROLAPSE

Watkins	77
Bissell's Resection of Uterus	12
Mayo Vaginal Hysterectomy	50
Vaginal Hysterectomy	74
Vaginal Plastics Only	81
Vaginal and Abdominal Combined	56
Abdominal Only	7
Emmet-Baldwin	4
	<hr/> 361

TABLE II
DEGREE OF PROLAPSE BY DECADES

AGE	1ST DEGREE	2ND DEGREE	3RD DEGREE
20-30	9	7	4
30-40	45	54	13
40-50	47	51	27
50-60	26	31	23
60-70	6	10	8
Totals	133	153	75

It would be valuable, for the purpose of study, to have these cases accurately grouped according to the degree of the prolapse in each case, but this has been impossible. There seems to be no clean-cut and gen-

*Read at a meeting of the New York Obstetrical Society, November 10, 1925.

erally accepted classification. Many designate the appearance of the cervix at or outside the vulva as "a complete uterine prolapse" or "a complete procidentia of the uterus," though there may in reality be very little actual descent of the uterus—only a marked elongation of the cervix. I maintain that the prolapse is complete only when the entire uterus is outside the vagina. There is confusion also as to whether prolapse and procidentia are synonymous. Many dictionaries consider them so. In Table II, I have classified as third degree only those cases with the entire uterus outside the vulva; cervix outside and internal os at the vulva, I have called a second degree prolapse and any actual descent of the uterus less than the latter, a first degree prolapse. I suspect that some of my third degree cases were really prolapse of the second degree, but the descriptions written by the surgeons compelled me to put them in the third degree classification.

TABLE III
WATKINS OPERATION (77 CASES)

Complete Success	(63.6%)	49
Success with minor defects or symptoms	(32.4%)	25
	(96.0%)	74
Bladder symptoms	16	
Slight cystocele	2	
Moderate rectocele	3	
Slight prolapse cervix	2	
Retroversion	2	
	25	
Complete Failure	(3.8%)	3
		77
1. Immediate infection		
2. Recurrent prolapse in 4 months		
3. Recurrent prolapse in 9 months		

TABLE IV
RESECTION OF UTERUS (BISSELL) (12 CASES)

Complete Success	(50.0%)	6
Success with minor defects or symptoms	(41.6%)	5
	(91.6%)	11
Bladder symptoms	3	
Slight cystocele	1	
Slight rectocele	1	
	5	
Complete Failure	(8.3%)	1
		12
Complete reoperation needed in 2 months		

An examination of the data on Watkins' operation of vaginal interposition of the uterus (Table III) reveals that 63.6 per cent of these cases were complete successes in every respect. I have classified 32.4 per

cent as successful also, but with minor defects or minor symptoms; this gives a total of 96 per cent practically satisfactory. A rather large group of these, though anatomically satisfactory, had some form of bladder irritation, in most instances lasting a few months but in a few cases lasting several years. This forms a considerable objection to this operation it would seem. Two cases had slight cystoceles recur; three had moderate rectoceles—certainly not to be blamed upon the Watkins' technique. Two uteri tore away and retroverted but without recurrence of the prolapse, and two had very slight recurrent prolapse of the cervix. Of the failures, one resulted immediately from wound infection. In the second case, the uterus gradually pulled away, retroverted, and again prolapsed into the vulva in about four months. The third failure was similar to the second and perhaps due to the inexperience of the operator, an interne.

Referring to Table IV, I have classified as a subheading under the Watkins' operation Bissell's resection of the uterus. This was an experimental procedure which excised the cervix and all but the lateral walls of the body of the uterus and interposed these stumps between bladder and vagina. After doing a dozen or more of these, Dr. Bissell discontinued the operation. From Table IV, it will be seen that only 50 per cent of these operations were absolutely satisfactory; one completely failed, and Dr. Bissell told me of numerous annoyances from necrosis of stumps, bladder irritability, etc., in others.

TABLE V
MAYO OPERATION (50 CASES)

Complete Success	(76.0%)	38
Success with minor defects	(18.0%)	9
	(94.0%)	47
Small enterocele	8	
Small urethrocele	1	
	9	
Complete Failure	(6.0%)	3
		50
1. Large enterocele in 2 months 2. Large enterocele in 6 months 3. Large cystocele in 2 years		

Table V summarizes the Mayo operation. Of these operations 76 per cent were found to be perfect anatomically and symptomatically, and adding the 18 per cent having minor defects, 94 per cent were found to be virtually satisfactory. Nine cases had quite small enteroceles giving no annoyance and not needing operation. There were three failures (6 per cent). One had a large cystocele which slowly developed for three years—the only one after a Mayo operation. The other two had large enteroceles necessitating reoperation. One developed within two months

of the operation and the other in six months. Dr. George Gray Ward, the leading exponent of this operation, noting an occasional enterocele following the Mayo operation, developed and published, in 1921, an addition to the original technic. After removing the uterus a high dissection, ligation, and excision of the herniated pouch of Douglas is done and an obliteration of the culdesac by suturing together the uterosacral ligaments. Since adopting this improved technic, three very small enteroceles have occurred which under observation (one for four years) have not enlarged and have given no trouble. One patient with large enterocele has been advised a reoperation.

TABLE VI
VAGINAL HYSTERECTOMY (74 CASES)

Complete Success	(78.3%)	58
Success with minor defects	(17.5%)	13
	(95.8%)	71
Small enterocele	5	
Small rectocele	6	
Small cystocele	2	
	13	
Complete Failure	(4.0%)	3
		74
Enterocoele in 2 to 6 months, surgeons admitted inadequate repair of culdesac		

A survey of Table VI shows the figures for vaginal hysterectomy, usually done here by the Bissell technic, 78.3 per cent entirely satisfactory, 17.5 per cent virtually satisfactory; a total of about 96 per cent. Examining in detail the group with minor defects, we find that after this operation, as after the Mayo operation, a few enteroceles occur. It is so difficult to differentiate between high rectocele and enterocele in the early stage that some of these small rectoceles in this group may later on prove to be enteroceles.

Concerning the three failures in this group the operators admitted taking insufficient pains with the fascial repair about the culdesac. Not one of these three cases were operated on by Dr. Bissell or by Dr. Goff, his associate, and the Bissell technic was probably not skillfully carried out.

The group entitled vaginal plastics only (Table VII) contains almost entirely patients with first and second degree prolapse. None of them had the uterus removed. These prolapsed uteri were held up in most instances by repairs of cystocele and of pelvic floor lacerations; a few patients had uterosacral ligament shortening, and a few had Alexandroff's shortening of the cardinal ligaments; 75.3 per cent were wholly satisfactory and 22.2 per cent practically so. This latter group consists of 10 cases with slight recurrence of cystocele and six cases with slight

TABLE VII
VAGINAL PLASTIC OPERATIONS (81 CASES)

Complete Success	(75.3%)	61
Success with minor defects or symptoms	(22.2%)	18
	(97.5%)	79
Slight cystocele	10	
Slight rectocele	6	
Slight dysuria	2	
	—	
	18	
Complete Failure	(2.5%)	2
		—
		81
Causes undiscovered, both reoperated		

rectocele—none had any recurrence of prolapse of the uterus. There were two failures, both reoperated within a few months. One, in a patient with a first degree prolapse, who had a simple repair of cystocele and perineum, the cervix amputated and the uterosacral ligaments sewed in front of it. She was an emaciated woman with loose kidneys, and had a complete recurrence in four months. The poor quality of her pelvic fasciae probably explains this failure.

The causes of the second failure are uncertain. Perhaps the vesico-vaginal fascia near the cervix was not well tightened up in the repair of the cystocele; the long cervix should have been amputated, and the repair of her lacerated sphincter ani, though it did not suppurate, was inefficient.

The next group, described as vaginal and abdominal operations combined (Table VIII) consists largely of cases of first degree prolapse. Here again the end-results are quite satisfactory; 76.7 per cent entirely successful and 16 per cent virtually so but with minor defects. This latter number consists of four cases of moderate recurrence of rectocele, two moderate cystoceles, two with slight prolapse of the uterus again, and one with occasional dysuria—no one of them needing another operation.

TABLE VIII
VAGINAL AND ABDOMINAL COMBINED (56 CASES)

Complete Success	(76.7%)	43
Success with minor defects or symptoms	(16.0%)	9
	(92.7%)	52
Moderate rectocele	4	
Moderate cystocele	2	
Slight prolapse of uterus	2	
Occasional dysuria	1	
	—	
	9	
Complete Failure	(7.1%)	4
		—
		56
Round ligament suspensions unsuitable for prolapse.		

There were four failures in this list and all seem to have been from errors of judgment. Two of these patients were fifty years of age; one had a second degree and the other a third degree prolapse of the uterus. Each had repairs of cystocele and perineum combined with ventral suspension, or Gilliam operation. That these latter two operations are unsuitable for uterine prolapse, I think will not be disputed. A third failure resulted from a similar error of judgment; namely, the employment of an Alexander operation for the correction of a first degree prolapse.

Table IX, abdominal operations for prolapse of the uterus, contains only seven cases. Obviously the gynecologist has little faith in any attempt to cure prolapse by the abdominal route.

TABLE IX
ABDOMINAL OPERATIONS (7 CASES)

Complete Success	(57.1%)	4
Partial Success	(14.3%)	1
	(71.4%)	5
Slight prolapse 4 years after fixation of uterus into abdominal wall		.
Complete Failure	(28.6%)	2
		7
1. In 2 months after panhysterectomy with suspension of vagina		
2. In 6 months after ventral fixation and Moschkowitz operation		

Only four of these seven cases are entirely cured. One patient whose uterus was fixed into the abdominal wall has an elongation of cervix and uterus requiring a pessary for comfort. Two of the seven are failures. One had the entire uterus, and an enterocele outside the vulva (the failure of a Watkins operation ten years before), and a troublesome umbilical hernia. The operator hoped to cure hernia, prolapsed uterus, and all by the abdominal route,—panhysterectomy, obliteration of Douglas' culdesac, and plication of cardinal ligaments. Prolapse of both vaginal walls began in two months and became rapidly worse.

The other failure was in a single woman with an inguinal hernia, and a second degree prolapse accompanied by an enterocele. As in the previous case the operator hoped to cure them all through one abdominal incision. The culdesac was obliterated by the Moschkowitz operation, a ventral fixation of the uterus with linen, and repair of the hernia were done. In six months the cervix descended, later the uterus tore away leaving a ventral hernia, and at reoperation fifteen months later, the enterocele also had recurred.

Only four Emmet-Baldwin operations were traced (Table X) and all patients were cured—one for seven years.

TABLE X
EMMET-BALDWIN OPERATION (4 CASES)

Complete Success	(100.0%)	4
------------------	----------	---

TABLE XI

TIME OF RECURRENCE OF ANATOMIC DEFECTS		
44%	within	3 months
28%	within	3- 6 months
12%	within	6-12 months
8%	within	1- 2 years
4%	within	2- 3 years
4%	after	3 years

Note: 72% within 6 months.

TABLE XII
SUCCESSFUL CASES; TIME UNDER OBSERVATION

TIME	NO. CASES
Under 6 months	73
6-12 months	30
1- 2 years	74
2- 3 years	48
3- 4 years	32
4- 5 years	9
5- 6 years	8
6- 9 years	8

Referring to Table XII, it will be seen that 73 of the successful cases of this series of 361 were followed up less than six months, that 30 others were observed from six months to one year, that 74 others were observed less than two years, giving a total of 177—about half of my whole series. However, inspection of Table XI shows that 72 per cent of the failures or anatomic defects appeared within six months of the operation, and that only 8 per cent of the total defects in the entire series occurred later than two years after operation. Failures of prolapse operations occur early.

COMMENT

It seems to me that the striking thing about this study of results of operations for uterine prolapse is that about 95 per cent of the cases are cured by vaginal plastic surgery.

The vaginal plastic work combined with ligament shortenings from above is satisfactory perhaps in cases of slight prolapse, but the careful fascial reconstruction by vagina undoubtedly is responsible for the success.

The majority of the gynecologists of today have long since ceased to attempt to cure descent of the uterus by any form of suspension or fixation by the abdominal route. Careful reconstruction of the various planes of the pelvic fascia that have become attenuated, over-stretched, or torn is the *sine qua non* of the operative treatment of prolapse.

In our series, the Watkins operation has not been followed by enterocele, but we have had a considerable percentage of cases with bladder symptoms.

The Mayo operation has been extremely satisfactory except for an occasional enterocele.

The vaginal hysterectomy by Bissell's technic has been most satisfactory, but unless perfectly done, and perhaps even then, may be followed by an occasional enterocele.

47 EAST FIFTY-SEVENTH STREET.

(For discussion see page 688.)

INFECTION OF THE ABDOMINAL INCISION, INCIDENCE IN FIVE HUNDRED GYNECOLOGIC LAPAROTOMIES*

BY CATHARINE MACFARLANE, M.D., F.A.C.S., PHILADELPHIA, PA.

A RECENT review of the histories of five hundred laparotomies performed by my assistants and myself in the Woman's Hospital and Woman's College Hospital led to certain conclusions regarding the incidence of wound infection which seem to have some practical value.

These operations were performed for gynecologic conditions in afebrile patients and ranged from exploratory laparotomy to panhysterectomy for cancer of the uterine fundus. They cover a period of twelve years at the Woman's Hospital and three years at the Woman's College Hospital. In this series of five hundred cases we have to report 35 infected wounds, or 7 per cent. Of these 35 infections, 19 were superficial and 16 were deep.

Since the operations of the series extended over a considerable period of time they were performed with varying groups of operating room personnel and under slightly different conditions of operating room technic. At one end of the series the hands of the operating team were disinfected by alcohol and bichloride solution; at the other end, by alcohol alone. Throughout the series the patient's skin was disinfected by tincture of iodine, and incision towels were used except in the earliest cases. It was gratifying to note that not only did the last half of the series show fewer infected wounds than the first half but that there was also a steady decline in the number of deep infections. There were six deep infections in the first hundred cases and none in the last hundred.

Upon investigating the final variable, the condition operated upon, we found that 17 of the 35 infected wounds occurred in patients operated upon for pelvic inflammatory disease. In 113 such cases wound infection occurred in 17, or in 15 per cent. Six of these infected wounds followed gross contamination with pus from rupture of tubo-

*Read at a meeting of the Obstetrical Society of Philadelphia, December 3, 1925.

ovarian abscesses during operation, while 11 occurred without such obvious contamination. It happened that our series included practically the same number of supravaginal hysterectomies for fibroid tumors of the uterus and in these 112 cases, wound infection occurred only 6 times or in about 5 per cent. Since the duration of the operation and the traumatism to the abdominal wall were probably about the same in these two groups of cases, we may conclude that the preponderance of infected wounds in the pelvic inflammatory cases was due to the nature of the condition operated upon.

We believe in operating for pelvic inflammatory disease in the chronic stage and, in cases under observation from the start, make it

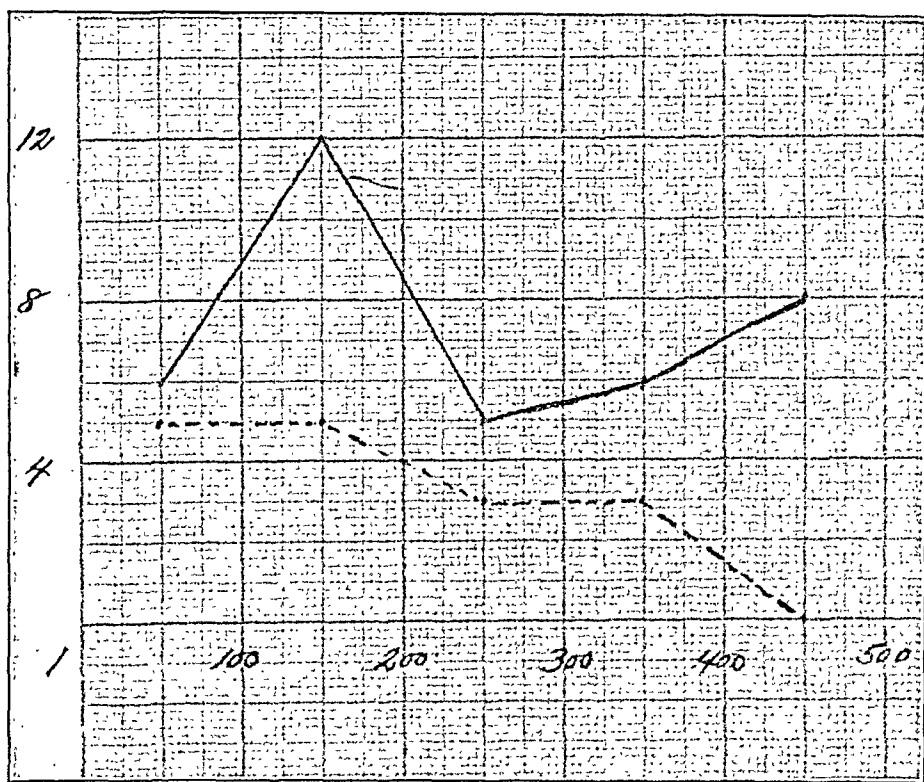


Fig. 1.—Infected cases per 100 operations ———.
Deep infections per 100 operations - - - - -.

a rule not to operate until the temperature has been below 100° for five weeks. Sometimes our patients disappear during the long interval of waiting, but on the whole this arbitrary rule has proved very satisfactory. We have never regretted following it, we have occasionally regretted not following it. Whenever we have been persuaded by some impatient individual to operate after only two or three weeks of normal temperature, deep infection of the abdominal incision has been the result. The majority of these patients are not under observation from the start, however, but present themselves in the out-patient department at varying intervals after a primary or recurrent attack. While afebrile when admitted, they may not have been afebrile very long,

and it is probable that we often operate upon them in the presence of a still active infection. In separating the adherent appendages from the bacteria-laden bowel, we may be stirring the embers of a smouldering fire and may bring to the closure of the incision gloves contaminated with organisms which the poorly resistant fat cannot withstand.

Led to conclude that every operation for pelvic inflammatory disease is conducted in a potentially infectious field, the practical question arose: Would it be possible to diminish our percentage of wound infections in this group of cases by repeating some of our preoperative antiseptic precautions before closing the wound? In the attempt to answer this question we are now taking the following precautions before closure:

Soiled incision towels are removed.

The operating team remove their soiled gloves, rinse their hands in alcohol, dry them, and put on fresh gloves.

Fresh incision towels are applied and the incision is closed with fresh instruments.

After closing the fascia, its upper surface, the fat and skin edges are painted with tincture of iodine, 3 per cent.

So far we have carried out these precautions in ten operations for pelvic inflammatory disease and have had superficial infection of the wound in two cases. We hope that a large series of cases will prove these precautions to be worth while and that a diminution in our incidence of wound infections will result.

CONCLUSIONS

1. Incidence of wound infection in five hundred gynecologic laparotomies, 7 per cent.

2. Incidence of wound infection in 113 operations for pelvic inflammatory disease included in the above series, 15 per cent.

3. Advisability of attempting to lessen the incidence of wound infection in the pelvic inflammatory cases by repeating the preoperative antiseptic precautions before closing the wound.

4. This has been done so far in ten cases with two superficial infections.

BLOOD PRESSURE AND URINARY FINDINGS IN 100 CASES OF NORMAL PREGNANCIES*

BY FRANCIS ASHLEY FAUGHT, M.D., PHILADELPHIA, PA.

IF WE accept the teaching that systolic blood pressure readings of more than 130 mm. are abnormal, and that systolic readings above this indicate impending danger, and if we believe, as it is commonly taught, that the presence of albumin, casts and red blood cells in the urine, with or without systolic elevation, indicates kidney deficiency, then all signs fail during pregnancy, and we must readjust our values to conform with everyday findings.

From a careful analysis of the cases contributing to this study it would appear that some means other than periodic blood pressure observations and urinalyses must become a part of our prenatal routine, at least, in those cases which present unusual systolic blood pressure elevation and urinary abnormalities. Otherwise, depending on our individual valuation of these variations, we may either under- or over-estimate the significance of the findings.

The data which follow are based upon a critical analysis of the periodic blood pressure and urinary findings in 100 cases of normal pregnancy observed in private practice. Most of these patients were studied from the third month on, a few as early as the beginning of the fifth week. All have been followed subsequent to their discharge, and it is known that there did not develop, subsequent to delivery, permanent damage to the cardiovascular or renal systems. Their ages ranged between eighteen and forty-one years. Several were observed during more than one pregnancy, but no classification is made in this study except to separate the primiparae from the multiparae; these were, as it happened, about equally divided.

The term normal pregnancy is used advisedly, as I have *not* restricted this term to cases in which hypertension and urinary abnormalities did *not* occur, but have included all those in which these variations were found unassociated with evidences of toxemia and in whom pregnancy terminated in a normal delivery and puerperium.

There were made in this series 600 blood pressure observations and 675 urinalyses. Of the 675 urinalyses, 309 or 44.1 per cent showed albumin, alone or with other urinary abnormalities. Of the total primiparae 12 per cent went through their pregnancy without finding albumin in urine, while 7 per cent showed albumin in all their urine examinations. Of the multiparae 10 per cent showed no albumin and

*Read by invitation before the Obstetrical Society of Philadelphia, Thursday evening, December 3, 1925.

5 per cent always had albumin in demonstrable quantity in their urine.

By months, the percentage of cases showing albumin in primipara and in multipara was as follows:

MONTH	PRIMIPARA	MULTIPARA
	%	%
1	2	0
2	5	3
3	8	8
4	12	11
5	15	8
6	21	17
7	21	15
8	30	18
9	29	21

From this tabulation it will be seen that albuminuria occurs with slightly greater frequency in primiparae than in multiparae.

Pursuing the analysis further I present the following tables showing the percentage occurrence by months in multiparae and primiparae of albumin and casts, I; of albumin, casts and red blood cells, II; of glucose, III; and of indican, IV.

I. PERCENTAGE, ALBUMIN AND CASTS			II. PERCENTAGE, ALBUMIN, CASTS AND RED BLOOD CELLS		
MONTH	PRIMIPARA	MULTIPARA	MONTH	PRIMIPARA	MULTIPARA
	%	%		%	%
1	1	0	1	1	0
2	2	0	2	0	1
3	0	0	3	0	3
4	1	2	4	3	2
5	2	0	5	5	4
6	4	1	6	4	7
7	2	1	7	7	5
8	4	0	8	6	4
9	2	3	9	4	3

III. PERCENTAGE, GLUCOSE			IV. PERCENTAGE, INDICAN		
MONTH	PRIMIPARA	MULTIPARA	MONTH	PRIMIPARA	MULTIPARA
	%	%		%	%
1	0	0	1	0	0
2	0	0	2	2	0
3	0	0	3	5	3
4	1	2	4	6	5
5	1	2	5	2	7
6	3	2	6	9	3
7	3	4	7	5	7
8	5	4	8	7	5
9	2	2	9	7	3

It will be seen that glycosuria is not unusual during pregnancy, occurring in 4.3 per cent of all specimens examined, being present most frequently in the sixth, seventh, and eighth months. The percentage of glucose met was rarely over 1.5 per cent, the highest being 4.7 per cent, occurring once. Twenty-four-hour collections were made whenever possible in determining these percentages. Only one case pre-

sented difficulty in eliminating sugar from the urine, and in no case was it found necessary to use insulin. One patient showed glucose in each of two successive pregnancies. Two patients showed no glucose in their first pregnancy, but did show it in their second. One patient with glycosuria during first pregnancy did not develop this complication in her second.

The average systolic pressure encountered at the time sugar was found in the urine was 121 mm., diastolic pressure 70 mm., pulse pressure 51 mm., as compared with the average in normal cases of 117 mm. systolic; 65 mm. diastolic; and 52 mm. pulse pressure. The highest systolic pressure met with glycosuria was 180 mm., and the lowest systolic pressure 90 mm.

The incidence of indican was slightly greater than glucose, occurring in 11.1 per cent of all specimens examined, frequently in conjunction with glucose. Primiparae show a slightly greater tendency to develop indicanuria, where in the sixth month, it was present in 9 per cent of all specimens examined. The highest systolic pressure met in the presence of indican was 160 mm., and the lowest systolic pressure 90 mm.

The following table shows the extremes of systolic pressure met in this series in conjunction with normal and abnormal urinary findings.

	MM.	MM.
<i>A</i> In presence of normal urine-----	150	80
<i>B</i> In presence of albumin-----	190	90
<i>C</i> In presence of albumin and casts-----	150	90
<i>D</i> In presence of albumin casts and cells-----	165	110
<i>E</i> In presence of glucose-----	180	90
<i>F</i> In presence of indican-----	160	90

For the reason that many pregnant women do not present themselves during the early months of pregnancy, the readings involved are comparatively few; therefore these figures are open to some question. In the remaining months the averages are based upon a sufficient number of observations to insure reasonable accuracy.

It will be noted that there is comparatively little variation in the monthly averages, all of which are within the recognized normal limits of blood pressure, except the first month (135 mm. Hg.) in patients showing albumin, casts and red blood cells, and in the last two months of patients showing albumin and casts. There is a slight systolic fall in most cases during the middle months.

The pulse pressures are quite uniform, although slightly larger than those considered usual in normal subjects. They are not noticeably affected by various urinary abnormalities, as compared with the above. It will be seen from Table V that individual elevations in systolic pressure are comparatively frequent, occurring 98 times, or in 11.5 per cent, of all cases.

V. NUMBER AND PERCENTAGE OF CASES, BY MONTHS, SHOWING SYSTOLIC BLOOD PRESSURE OVER 130 MM. HG.

MONTHS	CASES	PERCENTAGE
1	4	66
2	9	33
3	5	9
4	9	14
5	9	10
6	10	11
7	11	10
8	22	23
9	19	23
Average—	98	11.5

SUMMARY

1. There is practically no difference in the average blood pressure values in the primipara, as compared with the multipara.

2. There is slightly greater tendency for primiparae to show urinary abnormalities, which, however, does not appear to have any great significance.

3. We may expect to find a high incidence of albumin in the urine of pregnant patients, associated in many instances with casts and red blood cells.

4. The influence of these abnormalities on the average blood pressure findings is insignificant and well within recognized normal variations.

5. The persistent occurrence of albumin and other urinary abnormalities usually has little significance.

6. Individuals, not infrequently, show marked abnormal variations in systolic pressure, both below and above the normal limits, the occurrence of which does not necessarily indicate impending grave metabolic disturbances or toxic states.

7. The occurrence of glucose and indican as complicating factors during pregnancy must be taken into consideration since their incidence is comparatively frequent, and may be associated with comparatively great blood pressure abnormalities in the individual case.

8. Their significance and effect upon the pregnant woman is probably no greater than the other urinary abnormalities.

9. The mere elevation of systolic blood pressure does not indicate the approach of grave complications unless persistent, under which condition further light should be sought by a study of the blood for the detection of nitrogen retention and disturbance in the CO_2 combining power of the blood.

THE PASSIVE HYPEREMIA TREATMENT OF CHRONIC CERVICITIS

BY G. L. MOENCH, M.D., NEW YORK, N. Y.

(Asst. Prof. of Gynecology, New York Post-Graduate Medical School and Hospital)

THE best form of treatment for chronic cervical inflammation is still much in dispute despite all of the work constantly being done in this field. Furthermore, it seems to me that, with the varied morphology of this region, no one best method of treatment can ever be established. Treatment must vary with the pathology found in each individual case, and often a combination of various methods of treatment may be necessary to accomplish the desired result. In general, we can classify the various forms of treatment devised for cervicitis under the following five main headings, under which I will also consider their various advantages and drawbacks: (1) chemical treatment; (2) surgical treatment; (3) cautery; (4) radium and (5) passive hyperemia.

1. *Chemical Treatment*.—Douches, be they boric acid, potassium permanganate, bichloride of mercury, or other more or less similar substances, are in most instances of no avail in chronic cervicitis. Topical applications, iodine, Churchill's tincture, ichthyol, silver nitrate, alcohol injections, mercurochrome, acriflavine, argyrol, protargol, etc., are of use only in the very mildest cases, if at all. Other forms of treatment, such as Hollender's¹ bismuth paste injections, are not much better, and some, as, for example, the use of strong phenol or zinc chloride solutions, or Strobell's² method of using pure potassium hydroxide are not without danger.

As an adjunctant to other forms of treatment, however, chemical measures may play an important rôle in the treatment of chronic cervicitis.

2. *Surgical Treatment*.—For hypertrophic or cystic cervixes or especially inflamed lacerated cervixes with ectropion, surgery is probably the best form of treatment. The surgical procedure, however, must be adequate. The curette alone is worse than useless. The preferred procedure here is either Schroeder's or Sturmdorf's³ excellent operation or some modification of either. Amputations of the cervix are also much employed. At the same time one must remember that surgery cannot possibly remove all the infected tissue in chronic cervicitis, wrongly called endocervicitis, as the inflammation extends through the entire thickness of the cervix. This fact can be proved by the microscope. Surgery also has the added drawback that one operates in an inflamed area, and secondary infection and hemorrhages may and do occur. Again, amputations of the cervix, if done high

enough to eradicate the infection may cause abortions later on. Heineberg⁴ quotes Leonard in saying that 55 per cent of all pregnancies following high amputations of the cervix end prematurely. Finally, cutting off inflamed tissue can, after all, hardly be called "treatment."

3. *Cautery*.—The cautery treatment of chronic cervicitis has many advocates. It certainly achieves good results in many cases. At the same time one must consider the action of the cautery; if it is done only superficially or with a fine nasal cautery, as Dickinson⁵ recommended, the improvement of the lesion is due to the resulting hyperemic reaction. If, however, the cauterization is extensive and deep, it is open to the same objections as surgery, inasmuch as burning off tissue is not any better than cutting it off as far as the term "treatment" goes. The cautery may also cause scar tissue shrinking and stenosis of the cervical canal.

4. *Radium*.—Curtis⁶ claims to have cured eighty-seven out of one hundred and four cases of chronic cervicitis with radium. We tried radium on a number of cases at the Post-Graduate Hospital, on Dr. Furniss' service, without any results at all.

5. *Passive Hyperemia*.—About three years ago, before I had seen any of Van Doren Young's⁷ work or his apparatus, I started using passive hyperemia for the chronically inflamed cervix with much discharge and more or less erosion. Since that time we have used the method on H. D. Furniss' service in the clinic with gratifying results. Of course not all cases were treated in this way. Lacerated cervixes were operated upon, cysts were usually punctured with a fine cautery, and, as an aid to the passive hyperemia, we used 25 per cent argyrol solution, which we found by repeated trials to give the best results.

I believe that the only real "treatment" of cervicitis is by means of passive hyperemia. It is known that passive edema kills bacteria; it also stimulates fibrous tissue, lessens pain by reducing inflammation irritating nerve endings, and dissolves pathologic products; that is, all the necessary requirements of treatment are furnished by the passive hyperemia.

The apparatus which I evolved and had made in different sizes by a glass blower* is shown by Fig. 1-A. Two pieces of rubber tubing with a stopcock between them were attached to the glass tube and connected either to a big syringe (250 c.c. Bigelow bladder syringe) or an electric negative pressure pump. We found that about 15 inches of negative pressure was most desirable. The method of treatment was as follows: The tube was applied through a bivalve speculum over the cervix, the largest size that would pass being used. The air was now exhausted and the tube left on for about three minutes (this varied with the severity of the case). In the beginning, some cases had slight hemorrhages following the application of the suction tube for five minutes, so that we later reduced the time to the above-mentioned three minutes for most cases. After three minutes, the tube was removed and the pus and mucus wiped away, or, if necessary, sucked out with the pump through a small cannula. Generally, after the application of the

*Machlett & Son, 10 William St., New York City.

suction tube, the mucus would come away very easily in contradistinction to the tenacity with which it usually clings to the cervical canal. After the cervix was cleansed, the tube was reapplied and about one dram of 25 per cent argyrol solution was allowed to flow in through the funnel of the tube without letting in any air. The small loss of vacuum was now made up by additional negative pressure. The tube was left on again for about two to three minutes and kept tilted up so that the argyrol covered the cervix. Then, with the tube tilted up, the air was allowed to rush in by opening the funnel stopcock. The reason for this procedure was based on the following considerations. The mucus and pus are squeezed out of the cervical glands and canal by the hyperemic congestion and swelling of the cervix which squeezes together the gland and canal walls. If the pressure is now released, air will rush back as the cervix shrinks, because of the loss of vacuum.

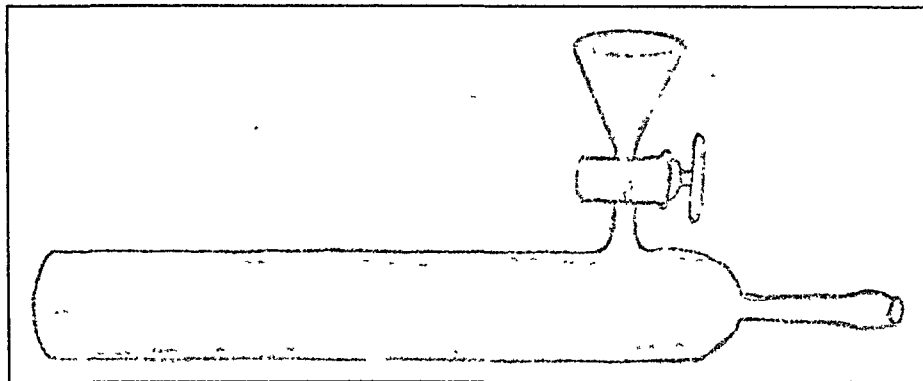


Fig. 1-A.

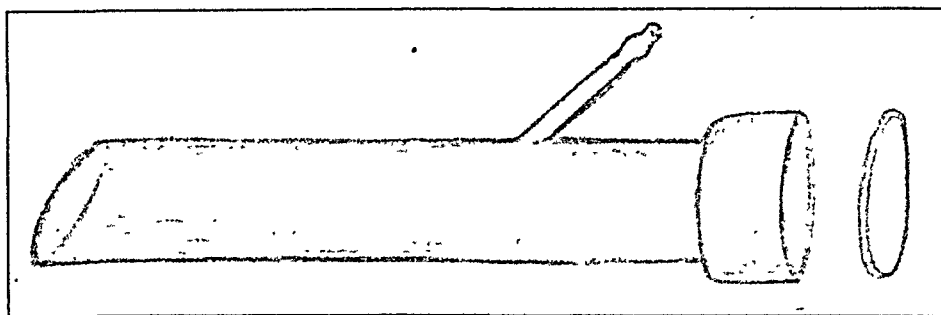


Fig. 1-B.

If, however, air is not available because argyrol completely covers the cervical os, the argyrol will be sucked up. After the treatment the cervical canal in our cases certainly showed argyrol in it.

The question is now which cases can be treated with benefit by passive hyperemia and which cannot. There is some discrepancy among authors on this subject. On looking through the literature after I had designed my apparatus, I found various types of tubes had been used for a number of different lesions of the female genital tract. One of these is shown in Fig. 1-B. A ring clamp was used to hold the cover onto the speculum after it had been placed over the cervix. This instrument was devised by Schindler⁵ and used to treat uterine and adnexal inflammation. K. Mayer⁶ modified the above speculum by putting two nozzles on the cover and leaving off the one on the speculum itself. Mayer used this

speculum for the same conditions as Schindler. Even before this, however, (1905) Rudolph, Eversmann and Bauer¹⁰ have used passive hyperemia of the cervix for amenorrhea, infantile uteri, endometritis, parametritis and sterility. All three authors considered pregnancy and acute inflammation the only two contraindications to the method. Matzenhauer and Weitgasser¹¹ used suction in cases of cervical discharge and especially chronic gonorrhea. Fernhoff¹² used suction in chronic cervicitis. He claimed benefit also in cases of atrophy and hypoplasia of the uterus. He expressly stated, however, that no case with any chronic inflammation of the adnexa should be treated with passive hyperemia. Van Doren Young⁷ used passive hyperemia for chronic cervicitis, circulatory stasis due to subinvolution or malposition or both, also in hypertrophic endometria, periadnexitis, amenorrhea (not due to pregnancy), dyspareunia, sterility, etc. He considered malignancy and pregnancy as the only two contraindications. Van Doren Young used intermittent hyperemia, claiming that the repeated breaks in the vacuum caused stimulation of the muscles of the uterus, which sounds logical. Di Palma presented a very ingeniously devised instrument at the New York Academy of Medicine last year. This instrument combines suction, irrigation and the application of medicated solutions, but I believe it is not without danger, because there is no real assurance that the irrigating fluid will not enter the uterus and the tubes. Di Palma himself reported no untoward results of any kind, but I believe that his work was done mainly on patients with tubes closed by chronic salpingitis.

If we now compare the work of the various men just cited, we see that the contraindications given by one man are not recognized by another, and, at times, are even made indications for treatment.

At the New York Post-Graduate Hospital we have not used passive hyperemia in any acute infections of the female genital tract or in malignancy or suspected malignancy or in pregnancy or suspected pregnancy. At times when passive hyperemia treatment of the cervix was used in cases of cervicitis, complicated by chronic peri- and parametritis, a slight temporary increase of pain occurred, but this soon abated and general improvement followed. As a result, we did not consider chronic adnexal inflammations as a contraindication to the suction treatment.

Clinical Results.—Altogether, we have used the suction treatment of the cervix on over two hundred women with very good results in most instances, and improvement in every case, with the exception of about six. The latter had abundant thin purulent discharges and hypertrophic cervixes and, with one exception, were not regular in attendance. We now reach what is, perhaps, the only drawback to the passive hyperemia treatment: It requires time and patience. Generally two to three months of regular attendance two to three times a week were necessary

to cure a severely infected cervix. Improvement was, however, often seen even after two or three treatments. It was surprising how much mucus could be expressed at the first treatment from what had at first appeared only as a mildly inflamed cervix. After two or three treatments, generally, very little mucus was left. The most surprising result we had was our first case. This patient had had discharge and pains in the back for ten years (since birth of last child); the physical findings showed marked chronic cervicitis, with erosion and much discharge, bilateral salpingo-oophoritis, prolapsed enlarged left ovary, and posterior parametritis. Eight treatments at biweekly intervals, combining passive hyperemia and 25 per cent argyrol, cured this patient completely after she had been otherwise treated by various physicians for years. When last seen, one year after cessation of all treatment, the woman was still well. Some other patients did almost as well, five or six weeks being sufficient to cure them.* A number of patients, who had not been pregnant in years, conceived shortly after the cervical lesions had been cleared up.**

In order to have controls, we at first ran parallel groups of patients, treating one group with suction and 25 per cent argyrol as described, another with suction and topical applications of argyrol, a third with argyrol only, a fourth with suction only, and a fifth with various other medicaments. In all cases the first group of patients did best.

In twenty-five of the patients we made smears and cultures of the cervixes at short intervals. In most cases the bacteria would decrease with the subsidence of the inflammation, but sometimes many bacteria would be present in an only slightly inflamed cervix, whereas a marked cervicitis showed very few. Despite the fact that special gonococcus culture media were used in all cases, in addition to the routine media, we were never able to grow any gonococci.

REFERENCES

- ¹Hollender: Illinois Med. Jour., 1921, p. 323.
- ²Strobell: New York State Med. Jour., July, 1923.
- ³Sturmdorf: Gynecologic Technology, F. A. Davis, Philadelphia, 1919.
- ⁴Heineberg: New York Med. Jour., 1920, p. 706.
- ⁵Dickinson: Trans., Am. Gynec. Soc., 1921.
- ⁶Curtis: Surg., Gynec. and Obst., 1923, Jour. Am. Med. Assn., 1923.
- ⁷Young: New York Med. Jour., Oct. 5, 1921; January, 1925; AM. JOUR. OBST. AND GYNEC., September, 1922.
- ⁸Schindler: München. Wehnschr., 1908, No. 48.
- ⁹Mayer: Zentralbl. f. Gynäk., 1909, p. 210.
- ¹⁰Rudolph, Eversmann, Bauer: Quoted by Matzenhauer and Weitgasser.
- ¹¹Matzenhauer and Weitgasser: Wien. klin. Wehnschr., xxxv, No. 48.
- ¹²Fernhoff: Wien. klin. Wehnschr., xxxvii, No. 37.

30 EAST 58TH STREET.

*One of these cases was unusual inasmuch as too strong suction caused hemorrhage into the small nabothian follicles present and so cured them.

**See in this connection also Moench: Some Experiences With Gas Insuffl. etc., Jour. Am. Med. Assn., June 13, 1925, and same author: The Therapeutic Action of Carbondioxide Insuffl., etc., Med. Herald and Physiotherapist, August, 1925.

THE CONDUCT OF LABOR AFTER CESAREAN SECTION*

BY ADDLEY H. GLADDEN, JR., M.D., F.A.C.S., NEW ORLEANS, LA.

IN Touro Infirmary there were but two cesarean sections done for eclampsia in 1924, which seems to prove that the conservative treatment of this condition will markedly decrease the number of such cases presenting themselves for delivery in subsequent pregnancies. The same rate of decrease is noted in abdominal delivery for such conditions as placenta previa, face and brow presentations, etc., and it is probable in the future that the main field for cesarean section will be in contracted pelvis. As such cases, of necessity, should always be delivered abdominally, we may eliminate them from further discussion at this time.

There are but two methods by which to deliver a case on which a cesarean section has formerly been done: another abdominal section, or an attempted labor with delivery by natural channels. In either method there is danger, and some authorities consider that the latter offers the more risk. In fact Newell, while admitting the possibility of safe delivery in the natural manner, believes the risk is so great that he inclines to the doctrine, "Once a cesarean, always a cesarean," and accordingly advises all cases which consult him to submit to operative delivery again. In the same connection he gives the incidence of ruptured cesarean section scars as 2 to 3 per cent.

In earlier years the rupture of these scars was frequent, due to the ineffective methods of suturing in vogue. Since the adoption of the Sanger method of suturing in tiers, however, the incidence of rupture has greatly decreased. From 1882 to 1895 Sanger collected a series of 500 cases without a rupture, and from 1895 to 1911 but 40 cases of rupture were reported. In an investigation covering the last five years I could find but two instances of ruptured scar at Touro Infirmary and only one instance at Charity Hospital, while during the same period there were delivered 3,096 women at Touro Infirmary and 5,555 women at Charity Hospital. It is interesting to note that the Charity Hospital case ruptured twice. The first rupture occurred when she was seven months pregnant, at which time laparotomy was promptly done and the uterine scar excised; a prompt recovery ensued. A year later the scar again ruptured at full term. Hysterectomy was done at this time, and an uneventful recovery followed. The outcome of such accidents, however, is not always so fortunate.

The strength of the uterine scar seems to depend primarily upon the method of closure of the uterine incision; if this is done correctly and

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, December 10, 1925.

there is no subsequent infection, the scar will be able to withstand the strain of pregnancy and labor. Experiments have been made by attaching weights to a section of a uterine wall containing a scar, and it was found that rupture usually took place in the muscle, or else began in the scar and extended through the musculature at the side of the scar.

The transverse fundal scar seems to have had more than its share of ruptures, in view of the fact that this type of operation is done much less frequently than the classical operation. Within the last few years the low cervical incision has been advocated because of its decreased chances of rupture. As a general thing we may say that if the uterus is properly sutured in tiers and the convalescence is afebrile, primary healing has probably taken place, but we must admit that the scar is an unknown factor in all cases.

In their recent textbooks Williams, DeLee and Polak have failed to discuss the handling of cases formerly delivered by cesarean section, and this omission, it seems to me, should be rectified in future editions, in view of the problems which such cases ordinarily present to the inexperienced practitioner.

I have been able to collect a small series of 21 cases of subsequent pregnancies following cesarean sections done for other causes than the absolute one of contracted pelvis. Of these six were later delivered by repeated cesarean, with two deaths, and fifteen were allowed to go into labor, three of which ruptured, with a fatal termination in two instances. The other twelve were delivered by the vaginal route by breech extraction or mid or low forceps. It is only fair to state, however, that two of these cases were admitted after the rupture had taken place and had not been carefully supervised during pregnancy and labor. It is also worthy of note that one of the twelve patients has delivered five times by the natural route since her first delivery by cesarean section.

Recently a patient of mine, twenty-eight years of age, who had had a cesarean section ten years before for eclampsia, developed pre-eclampsia at eight months, her condition becoming progressively worse in spite of intensive treatment. When her blood pressure had reached 170/100 and her albumin 25 per cent, labor was induced with one of the larger Voorhees' bags. Her pains were controlled by morphia and nitrous oxide anesthesia. When the bag was expelled, the membranes were ruptured, and when the head had reached the midplane, forceps was applied, ethylene being used for complete relaxation. A live baby was delivered without episiotomy. The albumin disappeared entirely within four days, the blood pressure dropped to normal shortly, and convalescence was uneventful. The baby is thriving. There was no difficulty in this particular case, but it should be emphasized that each of these patients should be considered as an individual problem, and

each should be watched carefully throughout the entire pregnancy by someone with sufficient training and experience to detect the first untoward sign.

It seems almost unnecessary to state that any case of former cesarean section should be delivered in hospital, and that no pituitrin should be given before delivery. If the former cesarean was done for contracted pelvis, another abdominal section is indicated. If the first operation, however, was done for other than the absolute cause, I believe the risk is less if the patient is delivered vaginally than if the cesarean is repeated, particularly in view of the fact that the average mortality rate for this procedure is at least 10 per cent.

There are certain points to be borne in mind if vaginal delivery is determined upon. The former convalescence should have been afebrile, and the pelvic measurements should be ample, with the baby not oversized. The induction of labor with Voorhees' bags two weeks before the expected date of confinement is a wise procedure in many cases. The patient should never be delivered outside of a hospital, the severity of the pains should be controlled by morphia and a general anesthetic as indicated, and midforceps should be applied and episiotomy done to relieve the strain of the second stage as soon as possible. It should be emphasized also that these precautions are necessary in every subsequent labor. One successful test of labor by the natural channel does not guarantee the scar against rupture in all following pregnancies.

Considering the fact that the incidence of ruptured cesarean scars is reported as being from 2 to 4 per cent, while the mortality following cesarean section averages 10 per cent or more, I believe it is both safer and more logical to attempt to deliver through the natural birth canal those selected cases in which the requirements we have laid down above can be met.

THE MECHANICS OF BIRTH INJURIES, THEIR CAUSE AND PREVENTION*

BY J. W. NEWMAN, M.D., F.A.C.S., AND WALTER E. LEVY, M.D.,
F.A.C.S. NEW ORLEANS. LA.

(From the Department of Obstetrics of Touro Infirmary)

THE question of fetal birth injuries is one which concerns obstetricians, pediatricians, psychologists, psychiatrists, in fact, any and every one concerned with the physical and mental development of children. This is true whether the injury be immediately fatal or fatal during the first few days of life, or whether, if not fatal, it be productive of some permanent effect upon the mentality and physique. That the expectant mother is entitled to such care and consideration as only a physician skilled in obstetrics can give her, and that she is possessed of the unquestioned right that her anxiously awaited offspring be brought into the world physically and mentally healthy is beyond dispute. The pediatrician likewise has a right to demand of the obstetrician as healthy a product as proper prenatal care and skilful delivery can produce, so that the results expected of him may also be attained.

These ideals, at least in their fullness, seem at first glance unattainable. Perhaps they never can be entirely attained, but certainly they can be approached and more nearly accomplished by the better and more thorough training of attendants at childbirth, by educating women to demand the services of a specialist for their ordeal, and by impressing upon the general practitioner that obstetrics is a major branch of medicine, to be practiced by a specialist whenever and wherever possible, and never to be practiced in a casual manner by the inadequately trained man. According to such an eminent authority as Eardly Holland, more fetuses are killed by the complications of labor than die during pregnancy from placental or maternal disease; or, to be more precise, of the fetuses which died preventable deaths, exactly 32 per cent might have been saved by proper obstetrics.

It is the purpose of this brief communication to bring to your attention the mechanical causes of the more frequent types of birth injuries met by the obstetrician and his associate, the pediatrician, in treating the newborn.

Without any doubt the most prevalent and most dangerous of all such injuries is the intracranial type. In 14 recent autopsies performed by the Pathological Department of Touro Infirmary on infants suffering traumatic deaths, there were three intracranial hem-

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, December 10, 1925.

orrhages, and one instance of combined intracranial and abdominal hemorrhage. Five babies in this series were delivered by breech extraction. It is surprising how many times such conditions are not correctly diagnosed and the death is set down to asphyxia or some other vague cause. The reasons for intracranial hemorrhage are manifold. Chief among them may be mentioned the injudicious or improper use of forceps; the use of pituitrin; version and breech extraction; prolonged labors; and violent efforts at resuscitation. Ehrenfest, in his very excellent monograph on this subject, gives, as additional reasons, the supporting of the perineum and the attempt to stretch it over the advancing head. It is obvious that all of these causes affect the cranium and its contents in a direct mechanical way.

Let us stop for the moment and consider briefly the anatomy of the endocranium. The septa between the various portions of the brain, the falx cerebri, the falx cerebelli, and the halves of the tentorium cerebelli, originate from the inner periosteal layer of the cranial bones. As Holland has ably shown, there are, at certain points in these membranes, aggregations of fibers forming bands, developed to enable them to withstand the stress due to molding during labor and admirably situated according to mechanical principles.

When molding or excessive compression with the forceps occurs, a vertical elevation of the cranium is produced, with a resulting tear of the falx cerebri, the tentorium cerebelli, or both. In the aftercoming head in breech cases, this compression and elevation also occur, with resulting tears of the various septa. In other words, pressure applied at the opposite ends of the diameter lying between the occiput and the forehead results in a decrease in the anteroposterior measurement, and probably in an elevation of the cranium. Likewise, pressure applied between the base of the skull and the vault results in an increase of the anteroposterior diameter.

As a result of the stretching and tearing of the various septa, the thin-walled blood vessels, greatly engorged, are more than likely to be injured. Various types of hemorrhage may occur, as supratentorial or infratentorial, but all intracranial injuries, it should be pointed out, are not necessarily accompanied by hemorrhage. The latter types of injuries are classified by Ehrenfest as contusions cerebri, ischemic areas, and slight tentorial lacerations.

In addition, fractures of the various cranial bones may occur. These can be produced as a result of the faulty application of forceps and the use of excessive force, or by too much traction on the aftercoming head. We mention these particularly as examples of what can be produced mechanically by improper obstetric manipulations.

Such a paper as this, in our opinion, would be of little value if it presented merely destructive criticism and offered no suggestions for

bettering conditions. Decrease in birth injuries of the sort we have just described will, it seems to us, come to pass only if the following points are borne in mind:

1. The term "injudicious use of forceps" is really a misnomer; "injudicial" would describe better the almost criminal abuse practiced with this instrument. High forceps, the cause of so many stillbirths and so many traumatic lesions leading eventually to lowered mentality, should not be done in any institution, least of all in one where obstetrics is practiced as a specialty. Even the application of midforceps is limited to a small number of cases, and all the possible sequelae of faulty application, pressure injuries, etc., should be weighed carefully before resorting to this procedure.

2. Pituitrin is a bone of contention among obstetricians today, and it will always remain so until we realize that its use, before or, indeed, after delivery, should be as dependent upon the skill and experience of the attendant as is the use of the scalpel in the hands of the surgeon.

3. Version is a much more delicate obstetric procedure than cesarean section, is much more difficult of performance, is not so spectacular, and requires considerably more skill, thought, and mental and physical composure. Moreover, in no obstetric procedure is the accoucheur more dependent upon a well-trained associate, especially when it comes to the delivery of the head. Here, too, in our opinion, the application of forceps is not permissible, for the reason that the child's head has already been subjected to almost sufficient pressure to bring about disastrous results. In a very large series of cases delivered by version, the operators have never applied forceps to the aftercoming head. Occasionally this expedient may be resorted to in breech extraction, but these cases are negligible numerically. The possibilities of doing harm by extraction are so much greater than the little advantage to be gained by the method that we must look upon it almost as heroic treatment, only to be undertaken as a last resort.

4. When neither mother nor child give evidence of the evil effects of the so-called prolonged labor, we fail to see any reason to interfere merely on the ground that a certain period of time has elapsed since the first pains. This point, it seems to us, is not sufficiently emphasized in the textbooks, and it is undoubtedly responsible for a large number of stillbirths. Moreover, it is a condition which could easily be corrected if the obstetrician would consider each case upon its own merits and not attempt to be guided by a compilation of rules which tries to cover them all. A hard, slowly dilating cervix, even when the membranes have ruptured and the uterine contractions are severe, does not produce sufficient trauma to cause fetal death. It is what follows after the head, subjected to previous trauma, has passed

through the cervix that does the real harm, either because of the application of forceps too soon or because the *vis-a-fronte* of the rigid perineum is permitted to inflict further injury before the temporarily damaged fetal brain has had time to recuperate in its passage through the vagina.

5. Mouth-to-mouth insufflation before removal of all mucus from the trachea, instead of achieving good results, nearly always forces the mucus further down towards the bronchi and thereby mechanically obstructs respiration. Again, the forcing of mucus into the throat through the introduction of sponges into the mouth has the same effect, and this error should be guarded against in every method of artificial respiration.

Injuries to the clavicle and to the bones of the arm and the leg are fairly frequent. Fractures of the clavicle are most often caused by traction over the shoulders in delivering the aftercoming head in breech extractions. Clavicular injuries may also be produced when the attempt is made to bring down and deliver an extended arm. These are usually indirect, and are the result of the bone being caught between the course of the power and a fixed point, the bony pelvis, according to DeLee. Muus reported a series of 22 fractures of the clavicle in a series of 1700 vertex deliveries.

Fractures of the humerus are injuries of the direct type, and are the result of making traction on the arm itself, particularly in a case of aftercoming head where the arms are extended. This type of fracture can therefore be obviated by the employment of a proper obstetric technic and by a sufficiently deliberate delivery. In our opinion the chief responsibility for this accident can be traced to the fact so constantly impressed upon the medical student that not more than eight minutes should elapse between the delivery of the umbilicus and the head. The usual result is that the accoucheur becomes nervous long before this period of time has elapsed and fails to procure the most favorable position for the delivery of the arms. The following technic will reduce the number of such accidents to a minimum: The child's feet are grasped and pulled as far towards the mother's abdomen as possible; thereby the arms are brought nearly to the vaginal orifice. Two fingers of the accoucheur's hand, corresponding to the arm to be delivered, are then introduced into the vagina, and with a sweeping movement over the child's face in an inward and downward direction the arm is brought into view. No attempt should be made to deliver an arm anteriorly, as the symphysis forms a natural barrier to such an attempt. After the posterior arm has been delivered, the child is turned through an arc of 180 degrees and the same procedure is followed as for the first arm.

Injuries to the bones of the lower extremity are nearly always confined to the femur, and are invariably due to haste and poor technic.

Only recently the authors witnessed a case of breech extraction in which both femurs were fractured because the physician in charge made forcible traction by improper methods. Similar injuries might, of course, be caused to the tibia or fibula, or both.

Dislocations of the ankle, the knee and the hip are possible, especially in version or breech extraction. These injuries are of the direct type and are the result of traction on the bones below the particular joint. This should be guarded against particularly in breech extraction, and the child grasped over the joint, rather than above or below it.

Nerve injuries are fairly frequent, and the amount of trauma will determine whether the end-result is a paresis or a paralysis. Aside from those resulting from central lesions, the most common injuries of direct origin are to the facial nerve and the brachial plexus. The former is most often caused by pressure of a forceps blade, and more rarely by the bones of a contracted pelvis. In reviewing our records at Touro Infirmary we have found that a temporary paresis, seldom lasting more than four or five days, occurs in about $4\frac{1}{2}$ per cent of all forceps deliveries. The best treatment is obviously prevention by the proper and careful manipulation of the blades of the instrument. Perhaps the most distressing of the nerve injuries is that to the brachial plexus, which results in either a complete or a partial tearing of the nerves involved. It may be produced by the misapplication of forceps, by too forcible traction on the clavicle in the Mauriceau-Smellie-Veit maneuver, or, in vertex presentations, by hooking the finger into the axilla.

CONCLUSIONS

1. A large percentage, estimated to be as high as 75 per cent, of birth injuries may be avoided.

2. Practically every type of birth traumatism has been observed in cases of spontaneous labor.

3. The medical student should be made familiar with the natural mechanism of labor through careful and thorough teaching, and should be taught that interference is a last resort and not a first procedure.

4. The published statistics which tend to show the lowering of the fetal mortality rate are misleading, inasmuch as this reduction is due to better prenatal care, which eliminates deaths from toxemia and other preventable causes. Birth injuries are still responsible for an appalling number of fetal deaths, and reduction along this line can come only from proper obstetric teaching and practice.

OBSTETRIC SHOCK

BY EMERSON L. STONE, M.D., NEW HAVEN, CONN.

(From the Department of Obstetrics and Gynecology, Yale School of Medicine)

THE medical literature of the past few years has contained scattered references to a condition designated as obstetric shock, occurring under widely varying circumstances incidental to delivery. The clinical pictures described differ but little from those of pure surgical shock as it is universally known, but the material reported to date would indicate that additional factors may play a part in the production of shock complicating delivery.

The present paper aims to review briefly the few known facts regarding the etiology and treatment of shock in general; then, to set forth what has been observed up to the present time in relation to obstetric shock, and finally, to present some evidence from clinical observations with the double purpose of first emphasizing a tremendous problem of clinical obstetrics not fully appreciated by the profession; and second, to furnish some additional data whereby workers in the fundamental sciences may possibly gain renewed interest and stimulation, since the clinical problem unquestionably looks to the laboratory for its ultimate solution.

A standard work upon surgical diagnosis and treatment, written since the World War, in which the concept of this condition underwent radical changes, defines shock as follows: "A general bodily state following various surgical operations and wounds, characterized by a persistent low arterial blood pressure, rapid, thready pulse, pallor, sweating, and shallow, rapid respiration." (Nuzum.) Other observers emphasize the central vasomotor depression, subnormal temperature, cyanosis, sunken eyes and pinched facial expression, diminished pupillary mobility or myosis, scanty urine, and acidosis.

Primary (immediate) and secondary (delayed) shock are clearly recognized, and the constant finding of hypotension, insufficient circulation, and the resultant cellular malnutrition, recalls the analogous picture seen in profound hemorrhage, except that in the former cases the blood is not ordinarily lost externally.

However, not only are the symptoms and the routine treatment of hemorrhage and shock notably similar, but the former condition is often the precursor of the latter. That there may be an even more intimate relationship is suggested by Mayo's belief that perfect hemostasis is a positive prophylaxis against surgical shock; and by the work of Tweedy, who claims that the same poison derived from injured muscle can be generated by fresh effused and, particularly, by

unclotted blood, as in ruptured tubal pregnancy, concealed accidental hemorrhage, and hematoma formation. This conception further assumes that shock is chiefly characterized by a general elongation of all muscle fibers, including those of the blood vessels.*

The etiology of shock is not clear cut or attributable in our present state of knowledge to any one factor or complex. A variety of causes may underlie the condition, and a review of the most commonly accepted theories follows:

1. The nerve exhaustion theory, elaborated by Crile, assumes an impairment of the vasomotor mechanism, with exhaustion of the cells of the brain, liver, and suprarenal glands, resulting from the injurious effects of unfavorable afferent impulses.

2. The acapnia theory of Henderson holds that shock results from a reduced CO_2 content of the blood, while

3. The fat embolism theory, defended by Porter and by Bissell, aims to explain the condition by a closure of the capillaries with fat globules.

4. A primary cardiac failure has been repeatedly suggested; but more recently,

5. Cannon has announced the "exemia" theory, explaining the low blood pressure as due to a stagnation of blood in the capillary beds, associated with hemorrhage, absorption of toxic products from injured muscles, or both. A secondary acidosis due to diminished oxygen-carrying power of the blood is characteristic.

6. A still later concept of the mechanism of shock is announced by Bueno-Pimenta, who describes a compressive and decompressive interdependence between the blood pressures in the abdomen and skull. The elastic abdominal walls permit fluctuation without serious consequences, but the unyielding skull allows grave accidents when the pressure fluctuates at this point. Splanchnic paralysis is accompanied by congestion of the abdominal vessels with a corresponding decompression and anemia in the skull.

Experimental evidence supporting these theories has been presented, while investigative work from other authentic sources has cast doubt upon the conclusiveness of any or all of the theories expounded to date.

From the clinical rather than the experimental viewpoint, those factors which have been clearly determined to conduce toward collapse are severe injuries, penetrating wounds of the skull, perforating wounds of hollow abdominal viscera, open wounds of the chest, compound fractures of the extremities, multiple wounds, or extensive injury to muscle and subcutaneous fat. Beyond the exciting causes enumerated, observations upon wounded soldiers make it clear that cold, exposure, overwork, and insufficient or poor quality of food are potent predisposing factors.

From the aspect of the operation itself, an estimate of the general condition of the patient as an operative risk, the choice and execution of the anesthetic, attention to the factor of trauma upon the bowel, omentum, mesentery, and other hypersensitive organs, and postural

*Personal experience with three cases of autotransfusion, however, in which freshly effused blood has been removed from the peritoneal cavity, citrated and reinfused intravenously, has not confirmed this assumption. The blood rather has acted with remarkable specificity and resulted in clinical improvement.

considerations for the problem at hand, the latter feature being of continued import in the immediate postoperative period,—all combine to determine shock potentialities. All things being equal, the degree of shock is likely to be notably proportionate to the hemorrhage encountered, but this is by no means constant.

The diagnosis of shock amounts practically to a reiteration of the symptoms, but for practical clinical purposes the report of Fraser and Cowell adds valuable information. After a classification of char-

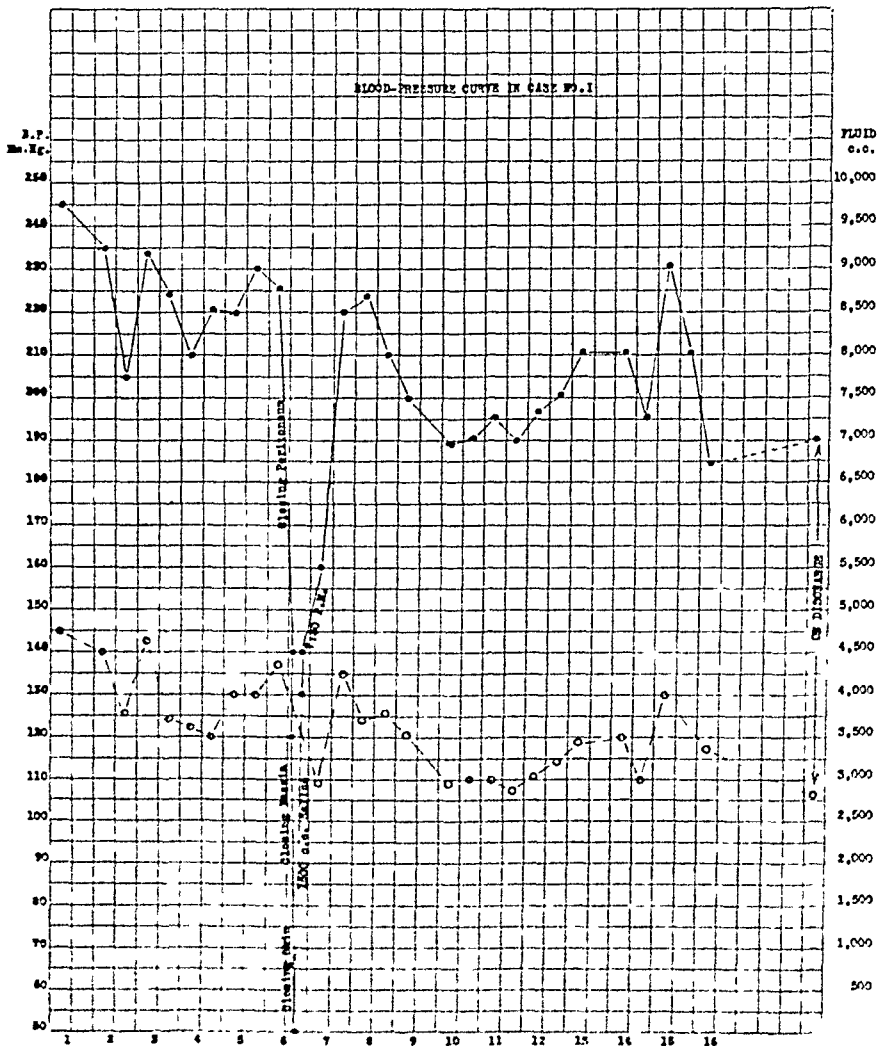


Chart 1.

acteristic systolic blood pressures in various degrees of shock, they assume 80 mm. of mercury to be the "critical level" of systolic pressure, below which the nerve cells and vasomotor mechanism become easily affected. Miller's figures assert that shock is in force when the systolic pressure reaches 80, the pulse pressure 20, and the pulse 120 per minute. It is probably shortsighted to apply sweeping generalizations to any surgical situation where every case is an individual problem, but a fundamental note is struck in these observa-

tions, namely, that the downward tendency of the systolic blood pressure is the first premonitory warning of impending shock, sometimes appearing as long as one to two hours in advance of the complete and tragic picture (DuPont). The routine observation of the patient's blood pressure at frequent intervals throughout the course of all operations has proved, in our experience, an invaluable aid in reducing surgical mortality and morbidity.

Such considerations gravitate naturally into the question of treatment, and the principle just enunciated is a cardinal feature of shock prophylaxis. Accessory factors, perhaps individually trifling but collectively important, are the careful manipulation of tissues, sharp dissection, accurate hemostasis, nerve-blocking in selected cases, postural considerations suitable to the case at hand, and prevention of exposure. Choice of anesthesia is extremely important, and most observers agree upon nitrous oxide or ethylene and oxygen in preference to chloroform or ether. Traeta claims that the two latter drugs are conducive to acute adrenal insufficiency in patients so predisposed.

Routine curative treatment is variable in its detail, but certain principles must underlie any rational course of therapy. The restoration of body heat by external applications and by the administration of warm fluids is of primary importance. Morphia is usually helpful and immediate transfusion is imperative, either by one massive injection or by repeated small amounts. In lieu of an easily available donor, a preparation of 6 per cent gum acacia in physiologic salt solution has been recommended. Variable results are reported, the theoretic advantages of the method being that it restores the blood pressure by increasing the total blood volume, and that it does not leave the blood vessels rapidly; but, because of the deficiency of cellular elements in the solution given, the oxygen-carrying power of the blood is not increased. Hypodermoclysis or proctoclysis are generally considered as inferior substitutes, but Lee claims them to be more effectual in the restoration of blood volume than intravenous physiologic saline.

Modern authorities deprecate the use of strychnine, camphorated oil, and adrenalin, not only because of their nonspecific character and their empiric failure to effect a result, but because of their transitory action under the most favorable circumstances. Caffeine, especially by intravenous injection, has received more favorable support. Morphia, however, not only conserves the patient's muscular resources, but diminishes the response of the cerebral centers to afferent stimuli.

Bandaging as a curative measure receives variable support from different authorities; Miller claims a rational basis for tight bandaging of the abdomen, but questions the value of its application to the extremities.

In appropriate cases, debridement, amputation, or the judicious use of the tourniquet, all contribute toward minimizing the occurrence of shock. Direct cardiac massage in the course of operation is a desperate remedy, but is especially advocated by those who assert that death results from cardiac failure, secondary to impaired nutrition of the myocardium.

The postoperative period calls for little else than continued vigilance, continued resort to the measures outlined, and symptomatic treatment as indicated; but Kosmak suggests the administration of alkalis, with or without glucose, by proctoclysis, or directly into the vein as a prophylactic against acidosis.

From this maze of variable symptomatology and relatively empiric treatment, any sincere attempt to classify the forms of shock upon a rational basis deserves consideration. The work of Du Pont makes a strong appeal toward this end because it aims to build on a basis of pathology, and it takes cognizance of factors which are cropping out of the cases of obstetric shock studied to date.

The clinical picture of shock is here conceived as one combining the features of profound intoxication or infection, plus those of hemorrhage, although such etiologic factors are not always clearly demonstrable. The more easily recognized precursors fall into three natural groups:

(a) Cases of ostensibly *nervous* origin appear to be caused by the reflex paralysis of medullary centers secondary to violent excitement of peripheral nerves, producing cerebral anemia and impaired nutrition; but this concept does not accord with those instances of delayed shock.

(b) *Hemorrhage* as a cause of shock is self-evident, but the observation is repeated that the degree of hemorrhage is not always parallel with the profoundness of the reaction.

(c) The remaining cases fall into a *toxic* group, where cellular life is suspended or inhibited, and the "inutiles" substances cannot transverse the cell wall into the circulation—resulting then, in autointoxication. In traumatic cases, the injury releases toxic substances into the blood, affecting many organs, including the central nervous system. Shock has been observed following the release of a tourniquet from a wounded extremity, allowing the toxic substances in a constricted area to be suddenly thrown into the circulation; while the same phenomenon may be observed without an external wound, or with a tourniquet applied to an uninjured member. Parallel determinations of nitrogenous content upon the traumatized muscle and the circulating blood imply an intense and rapid nitrogenous disintegration of the injured tissue.

In the opinion of Du Pont, infection may produce a similar picture, and toxic shock may be complicated by infection, but pure toxic shock exists. "L'hémorragie, les produits toxiques, plus tard l'infection, en s'ajoutant les uns aux autres viennent compliquer les choses et causer le shock. Il est naturellement très difficile dans les cas complexes de rapporter à chaque cause ce qui lui revient, mais chacune peut agir seule et suffire à créer le shock."

Obstetric shock is not particularly common, and Katz' report of 95 cases of sudden death in pregnancy and labor comprise 22 of fatal

internal disease, 30 of eclampsia, 24 of hemorrhage or embolism, and 19 of puerperal thrombosis—while shock, per se, is not mentioned.

It has been casually known for some time, however, and the subject received considerable impetus in a work published by Bailey in 1911, in which profound shock was described during the course of labors complicated by sudden falls of blood pressure, whether produced by rapid delivery, by the use of *veratrum viride*, or by both. Experimental observations brought out the surprising fact that rapid emptying of the uterus might be accompanied by a sudden fall of as much as 100 in the systolic reading, and the suggestion was made that elevated blood pressure might represent a protective mechanism which should not be regarded lightly.

Muret has described profound collapse following delivery, and claims that it can occur with or without extensive hemorrhage, while Gross speaks of its occurrence in the absence of either hemorrhage or previous constitutional disease, its etiology being wholly unexplained.

Miller states that it is occasionally seen in cases of protracted labor in weakened patients, in parturition complicated by accidents or following unduly forcible efforts to expel the placenta, as well as in rapid delivery and hemorrhage, but in none of these instances is the basic mechanism clear. The cases of Boursier and Rivière are referred solely to an underlying cardiac insufficiency. Favreau and Le Peuple report the occurrence of shock in four separate attacks, with no other tangible cause than the rapid emptying of an over-distended uterus; and Gaucherand reports the condition as a sequel to an uncomplicated curettage on the ninth day postpartum.

Gautret describes obstetric shock following the delivery of an unwelcome child, but with no demonstrable organic or physiologic basis other than a purely emotional one.

In the wake of these scattered reports, the more recent observations on obstetric shock are coming to emphasize a distinct clinical relationship between the collapse and certain associated or underlying toxic states incident to the pregnancy.

The work of Schwartz, published in 1923, as a result of his observation of specific cases of severe blood pressure reductions incident to labor, brings this concept to a head. Selected cases were studied chiefly with a view to noting any relationship between toxemia and shock, and among 80 normal cases no significant blood pressure alteration following delivery was observed, even in cases with a slight hypertension. Notable or extreme falls in systolic tension occurred, however, in cases of chronic nephritis and less regularly in other types of toxemia. The drops in pressure might amount to 100 or more, would make their appearance from two minutes to two hours after delivery, and unless promptly restored, would result in death. Fur-

ther, these blood pressure drops were prone to occur either in cases of rapid delivery or normal spontaneous delivery. That sudden release of intraabdominal tension, per se, is not a sole causative factor, is practically proved by his observation that cases of hydramnios and distention incident to twin pregnancy do not induce hypotension upon delivery, while our own experience with similar cases, and with the removal of large ovarian cysts, bears out this contention.

The cases of shock noted could not reasonably be attributed to the effect of drugs administered. The only explanation offered was that of the exhaustive effects of an unknown toxin upon the vasomotor mechanism, which failed to control the ensuing splanchnic dilatation, and led to an insufficient filling of the heart in diastole.

Close upon this report, appears the very significant work of Schickele. This contribution deserves due consideration because of the findings in four cases of obstetric shock which came to autopsy. In these instances, the liver showed grossly and microscopically multiple hemorrhages and necroses, resembling in every way those of eclampsia, with the exception that the lesions showed every evidence of being very recent.

This author assumes that such notably fresh lesions, in the absence of any clinical signs of liver dysfunction, tend to release this organ as a primary cause of death. It is quite likely, however, that such liver lesions are preexistent, but aggravated by fresh traumata, anesthetic, local, or constitutional. He further assumes that certain toxemias of pregnancy may be latent for a long period, and that eclampsia—as we know it—may not be fundamentally of sudden onset. The liver lesions, Schickele believes, precede convulsions, but are not necessarily followed by convulsive attacks ("latent eclampsia"). He further observes that if the contracting uterus throws poisons of muscular degeneration into the circulation, or if the placental site is to be looked upon in any sense as a wound, shock should be more commonly seen in obstetrics. As a corollary to this, uterine rupture and extensive pelvic tissue injury, per se, do not necessarily lead to shock.

Schickele therefore concludes that so-called obstetric shock is a definite entity, dependent upon anatomic changes, but that, in the usual sense, it bears only the most superficial analogy to surgical shock.

Rivière has collected forty-nine cases in which autopsy has invariably revealed underlying liver or cardiovascular pathology, and he agrees, essentially, with the statements of Schickele, emphasizing, however, that labor is the active agent in exciting the predisposed tissues.

One of Audebert's two cases complicated a frank attack of eclampsia, while two instances reported by Paucot involved the sudden decompression of an overdistended uterus in the presence of myocardial weakness and a so-called *infectious toxemia*.

Three cases of obstetric shock have occurred in this clinic within six months, and certain features of these cases so well accord with growing beliefs regarding the nature of the syndrome, that they are herewith reported.

CASE 1.—A white woman of forty-three years, para v, was first seen at the seventh month of pregnancy. A blood pressure of 245/145 was found, and the patient was admitted for observation and treatment, although there were no subjective symptoms.

Previous pregnancies, labors, and puerperia had been uneventful. Three weeks before admission, her former attendant reported a slight trace of albumin in the urine, but did not record the blood pressure.

The positive physical findings on admission were: (1) slight puffiness of the eyelids and moderate edema of the lower extremities; (2) a forcible apex beat with gallop rhythm, but without cardiac hypertrophy; (3) retinac covered with exudate, fluffy white patches, and a few small linear hemorrhages; (4) the uterus extending to a point 6 cm. above the umbilicus, and a living fetus of eight months' development in R. O. A.

After forty-eight hours, there was practically no fall in blood pressure, and the retinitis continued in an aggravated form. Albuminuria persisted and intramuscular phenolsulphonephthalein showed 70 per cent (50-20) excretion in two hours. Consultation upon the desirability of continued conservative therapy, with venesection, induction of normal labor, or termination of the pregnancy by cesarean section, favored the last named procedure, and abdominal section was performed. The delivery was accomplished uneventfully, and in spite of the hypertension, the total blood loss did not exceed 150 to 200 c.c. Gas-oxygen anesthesia was employed throughout.

At the beginning of the operation, the patient's blood pressure was 240 systolic, dropping to 220 after incision of the uterus. As the uterus was being sutured, the systolic reading was 200, which further dropped to 180 upon closure of the peritoneum. This was followed by a progressive fall to 120, where it remained for a brief interval, but as the skin edges were being approximated, it was noted that the blood pressure could not be registered, and that the radial pulse was not palpable, although the heart sounds were audible at the apex.

The patient was placed in the Trendelenburg position and warm blankets applied. Intramuscular injections of adrenalin and caffeine were followed by 1200 c.c. of physiologic salt solution by hypodermoclysis, and in about fifteen minutes the blood pressure had risen to 100 mm. systolic. The patient was fully conscious thirty minutes later, and the general condition was much improved, although the skin remained clammy for several hours. The rapid emptying of the uterus was the only feature of the operation which could possibly be interpreted as subjecting the organism to any undue strain. The postoperative course was uneventful, but the blood pressure fell from its normal figure of 210/130 very slowly, and the retinitis required about four weeks to clear to any appreciable extent.

At the time of discharge, the urine showed a very slight trace of albumin, with occasional hyaline casts, and the nonprotein nitrogen of the blood was 30 milligrams. The eye-grounds showed considerable exudate, but no fresh hemorrhages, while the systolic blood pressure ranged around 175 mm. The premature child was in excellent condition at birth, received maternal feeding throughout, and was discharged at birth weight.

CASE 2.—A white woman of thirty years, para ii, was admitted with the diagnosis of nephritic toxemia of pregnancy. The past history revealed "kidney trouble" dating from the one previous pregnancy in 1921. The fetus was of

four and a half months' development, and the blood pressure had risen steadily since the second month from 130/80 to 195/110 along with a progressive albuminuria. The subjective symptoms consisted of occasional headaches and black spots before the eyes.

The eye-grounds showed blurring of both disc margins, sclerosis of the retinal vessels, and one small hemorrhage, but without exudate or changes in the maculae. Nonprotein nitrogen of the blood was 51 milligrams, and the phenolsulphonephthalein output for two hours was 40 per cent.

The diagnosis of nephritic toxemia of pregnancy was confirmed, and because of the steadily increasing hypertension, albuminuria, and eye-ground changes, in the presence of a positive past history, it was decided to terminate the pregnancy by abdominal hysterectomy, and to effect sterilization by resection and burial of the tubes. The operation was uncomplicated, and the blood loss relatively slight.

At the beginning of the procedure, the blood pressure was 198/130, while the reading as the fetus was extracted from the uterine cavity was 188/120. The fall was subsequently more rapid, and as the abdominal wall was closed, the pressure read 120/90. Remaining for some time at this point, it again dropped to 110/90, while the pulse became rapid, irregular, and of poor volume.

Meanwhile, caffeine had been administered, and 700 c.c. of normal saline by hypodermoclysis had been absorbed by the conclusion of the operation. The pressure rose to 120/100, but fell within thirty minutes to a point where the pulse pressure was only 7. In spite of the added intravenous administration of 250 c.c. of whole citrated blood from a universal donor, respirations ceased at the conclusion of the transfusion.

Again, the sudden appearance of shock was neither attributable to hemorrhage, nor to any undue manipulation of the viscera. Autopsy was not permitted.

CASE 3.—A thirty-four year old primipara furnished another striking illustration of the same syndrome. The patient was referred to the clinic at the seventh month of pregnancy, with an admission diagnosis of preeclamptic toxemia. She had been married for ten years and had been previously treated for sterility, but the past history was otherwise negative.

Three months before admission, the blood pressure measured 150/80, and the urine showed a very faint trace of albumin. Under dietary regulation and restricted activity, the condition remained about the same. At the seventh month, however, the pressure gradually rose to 170/110, and was associated with headache, slight edema, and blurring of vision, whereupon she was sent to the hospital. With rest, fluid diet, and conservative treatment, the pressure remained about the same for one week, when it gradually rose to 210/100, and a convulsion followed. Induction of labor was immediately decided upon, and within two hours a bougie was inserted into the uterine cavity. Venesection of 450 c.c. of blood was performed and morphine administered, after which the patient passed a comfortable night.

On the following morning, the blood pressure was still high, but the urinary output was adequate. The bougie was removed and replaced by a No. 3 Voorhees bag, after which one more convulsion occurred. Upon spontaneous expulsion of the bag at 5 P.M., a complete secondary uterine inertia supervened, and after three hours of expectant treatment, the patient was subjected to light gas-oxygen anesthesia and an easy podalic version and extraction accomplished, only a few drops of ether being required for relaxation of the uterus. The premature child was alive upon delivery, but died within an hour.

An adherent placenta was treated by injection of the cord vessels with sterile saline, but ineffectually; and a manual removal was resorted to—the only deleterious effect of the latter being a slight prolongation of the period of anesthesia. How-

ever, during this procedure the blood pressure fell suddenly, and the typical shock picture supervened. In spite of stimulation, the pulse rose higher and the respirations dropped in rate until death occurred, all within ten minutes of the onset of symptoms.

SUMMARY

1. The premise has been made that obstetric shock may depend in part upon factors not ordinarily present or recognized in surgical shock.

2. The theories of shock production have been briefly reviewed, in order to aid in assigning to obstetric shock its proper place in the scheme, as it is at present understood.

3. Routine observations of blood pressure throughout the course of operation are recommended as the best prophylactic measure against shock.

4. Standard methods of treatment, with a brief criticism of their respective values, have been reviewed.

5. A clinical syndrome has been emphasized, which carries greater potential hazards than have been fully appreciated, wherein a clinical relationship between toxic states in pregnancy and coincident liability to shock is pointed out.

6. Evidence is quoted to the effect (Schickele) that these cases may have a definite anatomic and pathologic basis in selected organs, similar to the lesions of eclampsia; while the cases described, of clear-cut nephritis, suggest that their pathology may simulate eclamptic lesions more closely than has been ordinarily supposed.

REFERENCES

- Audebert, J. L.: *Rev. franç. de gynéc. et d'obstét.*, Paris, 1924, xix, 610-615.
 Bailey, Harold C.: *Am. Jour. Obst.*, 1911, lxiv, 260-270.
 Bissell: *Surg., Gynec. and Obst.*, 1917, xxv, 8-22.
 Boursier et Rivière, M.: *Bull. Soc. d'obst. et de Gynéc. de Par.*, 1924, xiii, 189-191.
 Bueno Pimenta, A. L.: *Brazil-med.*, 1922, i, 5-7; *Jour. Am. Med. Assn.*, 1922, lxxviii, 1237.
 Cannon: *Jour. Am. Med. Assn.*, 1918, lxx, 611-617.
 Crile: *Blood Pressure in Surgery*. Philadelphia and London, J. B. Lippincott Co., 1903, 422 pp.
 DuPont, R.: *Progrès. méd.*, 1919, xxxiv, 519.
 Favreau et Le Peuple: *Bull. Soc. d'obst. et de gynéc. de Par.*, 1924, xiii, 433-435.
 Fraser and Cowell: *Jour. Am. Med. Assn.*, 1918, lxx, 520.
 Gaucherand: *Bull. Soc. d'obst. et de gynéc. de Par.*, 1924, xiii, 655.
 Gautret: *Bull. Soc. d'obst. et gynéc. de Par.*, 1922, xi, 276-278.
 Grosse, A.: *Rev. franç. de gynéc. et d'obstét.*, Paris, 1923, xviii, 209-250; *Abst. Jour. Am. Med. Assn.*, 1923, lxxxi, 511.
 Henderson (Q. by Nuzum): *Am. Jour. Physiol.*, 1908-1910, vols. xxi-xxvii incl.
 Iracta, D.: *Semana méd.*, 1919, xxvi, 359; *Jour. Am. Med. Assn.*, 1920, lxxiv, 289.
 Katz, H.: *Arch. f. Gynäk.*, 1921, cxv, 253-312; *Jour. Am. Med. Assn.*, 1922, lxxviii, 69.
 Kosmak, Geo. W.: *Appleton's Obstetrical and Gynecological Monographs*, New York, 1921.
 Lee, B. J.: *Am. Jour. Surg.*, 1922, xxxvi, 166-169.
 Mayo, W. J.: (Quoted by Bissell, *loc. cit.*) *Surg., Gynec. and Obst.*, 1917, xxv, 8-22.
 Miller, A. H.: *Rhode Island Med. Jour.*, 1923, vi, 131-136.

- Muret: *Schweiz. med. Wehnschr.*, Basel, 1923, liii, 14-17; *Abst. Jour. Am. Med. Assn.*, 1923, lxxx, 881.
 Nuzum, J. W. (Ochsner): Philadelphia, and New York, 1920, i, 117-124.
 Paucot, H.: *Bull. Soc. d'obst. et de gynéc. de Par.*, 1924, xiii, 131-134.
 Porter: *Shock at the Front*. Boston, 1918, Atlantic Monthly Press.
 Rivière, M.: *Rev. franç. de gynéc. et d'obstét.*, Paris, 1924, xix, 457-489.
 Schickel, G.: *Gynec. et obstét.*, 1924, ix, No. 1, 123.
 Schwartz, O. H.: *AM. JOUR. OBST. AND GYNEC.*, 1923, vi, 656-672.
 Tweedy: *Jour. Obst. and Gynec. Brit. Emp.*, 1922, xxix, 382.

LIGATION OF THE INFERIOR VENA CAVA*

By O. G. PFAFF, M.D., INDIANAPOLIS, IND.

AS A basis for this discussion I desire to report a very unusual if not unique case which came under my care about two years ago.

Mrs. B., forty-eight years of age had borne a large abdominal cyst for some years without great discomfort. Ten days before being brought into the hospital, while carrying stove wood, she collided with a post, receiving a sharp blow directly over the tumor; she fell in pain and shock, and was carried into the house; the tumor suddenly became larger and the abdominal wall very tense and sensitive. During the ensuing nine days that she remained at home, her suffering was constant and necessitated the hypodermic use of morphine at intervals.

When I first saw her the distention and tenderness were very marked; her pulse was 120, of fair volume, and her temperature was 101. It was evident that a severe hemorrhage into the cyst-cavity had caused the picture which confronted us. On the following morning I opened the abdomen by a median incision and came upon a large fluctuating mass which was completely covered by intestinal coils. It was plainly a retroperitoneal cyst, and, on account of the size, it was with considerable difficulty that a satisfactory opening was made through the peritoneum near the pelvic brim. The adhesions between the tumor and investing peritoneum were firm but yielded readily. When the enucleation was apparently almost completed the wall of the sac gave way, and a great quantity of black blood clots and watery fluid was evacuated.

As the blood now copiously poured into the sac I packed several large gauze pads into the bottom of the cavity and, clamping the sac, made firm pressure with my right hand, while I made an attempt to complete the separation of the sac in the limited area wherein it still remained firmly adherent to the underlying postperitoneal structures, notably the aorta and the inferior vena cava. As the separation advanced a sudden deluge of blood showed me, on examination, that I was dealing with a ruptured vena cava which had resulted from the blow over the adherent tumor into which blood had poured. The rent was a large irregular opening which it seemed impossible to repair, and my only recourse was to ligate the vena cava; this was done above and below the point of rupture, using chromic catgut in both sections. The sac was now carefully trimmed from about the firm attachments to the aorta and the operation was completed in the usual way.

The convalescence was without any very unusual events, certainly none of the serious complications which I feared. Slight swelling in the legs and thighs was noticed after about ten days, and this was somewhat more noticeable after the patient was up and about; the condition soon cleared up entirely, however, and

*Read at the Thirty-eighth Annual Meeting of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons, held at Hot Springs, Va., September 16, 17, and 18, 1925.

she has had no trouble since. I heard from her recently, and she is apparently well in every way. It is now two years since the operation.

The literature on this subject is exceedingly interesting and very instructive.

The first case on record was reported by Kocher in 1883. He accidentally tied the inferior vena cava in the course of extirpation of a glandular metastasis of cancer of the testicle and this was only discovered at the autopsy.

In 1885 Billroth reported a case which he ligated, and it also ended fatally.

In 1893 Bottini successfully ligated the inferior vena cava, the patient making a complete recovery without circulatory complications. Since this time quite a number of reported cases have been added to the literature.

In 1904 Hartman operated upon a woman for a pyonephrosis. In the course of the operation, which was performed by the transperitoneal route, the inferior vena cava was torn on its right lateral border, to a length of three centimeters. Digital compression directly at the point of injury stopped the hemorrhage, and the longitudinal tear could be seen terminating above, three centimeters below the renal pedicle. The simplest and safest procedure seemed to be the ligation of the vena cava above and below the rent. This was done, and an uninterrupted recovery ensued. This case was presented before the Paris Surgical Society as a rarity.

Kohts in 1911 reported a case of injury of the vena cava which occurred during an operation for right-sided calculous pyelitis, which was performed through a lumbar incision. The kidney and the vascular pedicle were imbedded in thickened scar tissue. The vascular pedicle was given off very high up, and dissection of the vessels was difficult. In clamping the vessels a fold of the vena cava was accidentally included, and, after division of the vascular pedicle, the included cava segment slipped out and profuse hemorrhage resulted. Venous suture was attempted but proved unsuccessful on account of friability of the wall; consequently central and peripheral ligatures were applied. The patient developed thrombophlebitis of both legs which gradually cleared up, and a year and a half later he was quite free from all symptoms excepting a slight swelling of the legs after prolonged standing.

Dr. William Mayo informed me that he had repaired incised injuries to the inferior vena cava in three cases. These he sutured and then added the ingenious device of a fat splint; taking a piece of omental fat he applied it directly over the injured line and secured it in position with catgut; these cases all recovered.

A. L. Chute reports four cases of injury to the inferior vena cava, all being complications of difficult nephrectomies. In two the bleeding points were picked up and ligated. One of these died within a few hours; the other made a good recovery. In another case he placed a clamp on the bleeding line, removing it on the eighth day, and the patient made an uneventful recovery. In a fourth case he was unable to control the bleeding by suture and packed the wound, but the patient died four hours later.

L. Guerrey in 1913 reported the case of a woman of fifty years with typical calculous pyonephrosis. In the course of nephrectomy the vena cava was injured. Her general condition did not permit an attempt at either ligation or suture. The bleeding was controlled by the use of two Kelly clamps so placed that about one-half of the caliber of the vessel was occluded, and the patient made a good recovery. He had the same experience in a second and third case, the second one, however, had much resultant temporary edema and then made a good recovery. In all three of these cases the clamps were left locked for seven days and removed on the eighth day.

Fromme reported a case of septic pyemia following an induced abortion in which a diagnosis of external iliac thrombus was made; at operation the thrombus was found to involve also the vena cava. Ligature of the vena cava was performed. No untoward symptoms developed, but the woman developed a bronchopneumonia and died thirty-three days after the operation.

I have succeeded in collecting reports of thirty-seven cases wherein the inferior vena cava was subjected to surgical interference. Nearly all of these cases were injured during the course of abdominal nephrectomies. In nineteen cases, total ligature of the cava was done, with six deaths; in seven cases, lateral ligature, with two deaths; in five cases, suture of the wounded vessels, no deaths; in six cases, forcipressure to the wounded vessels, no deaths; in one case, packing to vessels, one death.

In order to draw a fair conclusion as to the value of these various procedures and, if possible, to determine the proper place for each, a careful consideration of some related facts must be made.

The first recorded case of total ligation by Kocher was an accidental occurrence which was only discovered at the autopsy. The second case by Billroth was one in which he mistook the vena cava for a distended renal vein. This patient died within an hour. Küster accidentally cut the vena cava in the course of a nephrectomy and ligated the upper end only, as he was unable to find the lower end. The wound was packed, but the patient died in twenty-six hours. In doing a hysterectomy for cancer, Ludner tied the vena cava, which was also involved in the malignant process, and the patient died immediately following the operation. Goldman ligated the vena cava in a patient who was in a very poor condition from large pyonephrosis. This patient died a few hours after operation, as Goldman believes, from her desperate general condition and not at all from the ligation. Kocher's accidental case should hardly be considered. Billroth's patient, also a case of an inadvertent ligature of the vena cava, died within the hour as did also the case reported by Lindner. Goldman's patient died within a few hours, and in Küster's case the lower end of the wound in the cava was not secured; this patient lived twenty-six hours.

In these five fatal cases it is quite plain that the deaths were due to the extreme exhaustion of the patient and could not fairly be charged to the ligation, and in attempting to determine the actual seriousness of this procedure, they should not be considered. On this basis, then, we have fourteen cases of total ligation with two deaths, a mortality of a trifle over 14 per cent. There were seven cases of lateral ligature with two deaths, but as one of these patients lived only three or four hours following the operation, it is fair to believe that death was due to the general effect of the operation and not to circulatory changes. This leaves six cases with one death, or 16 per cent.

The five patients which were sutured all recovered, as did also the four patients treated by forcipressure. One patient treated by packing died.

Gosset, Lecene and others ligated the vena cava experimentally in a number of dogs without any apparent ill results in any case.

A careful study of all available cases wherein the lumen of the vena cava has been encroached upon by lateral suture or the application of clamps, or completely ablated by total ligation, shows that the occasional resultant temporary edema is about as likely to occur in one class as in the others, and this edema apparently always clears up and there is finally no evidence of the surgical interference.

The necessity of surgery of the vena cava presents itself always as a complication of some serious abdominal operation and there is as yet no evidence that such interference has contributed to the fatal outcome in any case, and indeed I think it safe to say that the ligation of this great vessel is really a very safe procedure and one which is free from any very serious or lasting complications.

It would seem to be the operation of choice in all cases *excepting* those in which the damaged point is above the renal veins, when, of course, total ligation would result disastrously. Here it is necessary to preserve much of the lumen of the vein either by suture, lateral ligation or by clamps. Fortunately nearly all of the cases so far encountered have been below the renal vein. Undoubtedly the fear and dread of total ligation has induced surgeons to waste much valuable time in efforts at repair, when in reality the quickest and simplest procedure, that of total ligation, appears also to be the safest and best.

In conclusion: These interesting cases are of well defined practical value; in the light of the brief histories we realize that the ligation of the inferior vena cava (at least in a favorable situation) is not necessarily a disaster, and the thought is certainly one which may well comfort the surgeon who is suddenly confronted with the necessity of such action. It seems to be clear that the collateral circulation is rapidly developed to the extent that within a few weeks the early edema is but slightly in evidence, and it eventually disappears altogether.

Ligation is probably safer than suturing the wounded vessel, and on this account is generally to be chosen; however, if the site of injury should be at or above the renal vein, every effort must be made to repair the vessel, as ligation in that locality would inevitably mean disaster; fortunately, in all of the cases which have come to my attention, the vessel was damaged below the renal vein, and nearly all of them made complete surgical recoveries, without any of the serious accompanying complications which might naturally be feared.

ON THE NEED FOR A UROLOGIC DEPARTMENT IN EVERY GYNECOLOGIC CLINIC*

BY HARBECK HALSTED, M.D., AND IRA WILENS, M.D., NEW YORK, N. Y.

UNTIL July 1, 1921, we cystoscoped and treated patients with pyelitis and cystitis referred to the Vanderbilt Clinic directly from Sloane Hospital. This work was rather haphazard and was done in conjunction with the work of the regular gynecologic clinic, and no attempt was made to keep any record of these cases other than casual notations upon the clinic record; so, for the purpose of this report, we have lost track of and cannot report upon cases before July 1, 1921.

The requests for cystoscopy to help in the gynecologic diagnosis became so frequent and the necessity for treating the cases of urinary infection in some systematic manner became so evident that a department of the Vanderbilt Gynecological Clinic was established for the diagnosis of various urinary conditions, the treatment of the infections, and the referring of the serious surgical conditions either to the Presbyterian Hospital, if the condition was urologic, or to the Sloane Hospital if gynecologic.

The following report covers all the cases from July 1, 1921, to July 1, 1924.

During this period there have been 5000 cases seen in the gynecologic clinic, and of these, 162 were referred for diagnosis or treatment, or both, an incidence of 3.25 per cent.

Some of these women were only seen once, and others were seen often and treated for a year or more, the latter usually being cases of chronic pyelitis that had existed untreated, or treated only with urotropin by mouth for years before applying to the clinic. One patient with colon bacillus pyelitis had known of her trouble for twenty-eight years before applying for treatment.

The following table gives the incidence in the various age groups:

AGE	NUMBER	PER CENT
10 - 20	4	2.46
21 - 30	36	22.14
31 - 40	46	28.39
41 - 50	47	29.01
51 - 60	21	12.96
61 - 70	8	4.92

*Read before the Section of Obstetrics and Gynecology, Academy of Medicine, New York, October 27, 1925.

The parity incidence is as follows:

PARA	NUMBER	PER CENT
0	35	21.5
I	29	17.9
II	21	12.9
III	17	10.4
IV	19	11.7
V	13	8.6
VI	6	3.7
VII	6	3.7
VIII	6	3.7
IX	7	4.3
?	3	1.8

As would naturally be expected, the majority of cases were in women who had borne children.

The *symptoms* complained of in the order of their frequency were: Frequency of urination, painful urination, incontinence, burning on urination, hematuria, and backache.

The most notable thing seems to us the number of women who complained of incontinence, 18 cases, and hematuria, 12 cases.

Bacteriologic Findings.—A culture is made of the bladder urine of every patient admitted to this department. Cultures are made of the urine from the separate kidneys only when indicated.

The following table indicates our findings:

ORGANISM	CASES	PER CENT
Bacillus coli communis	79	36.3
Staphylococcus pyogenes aureus	68	31.3
Streptococcus	35	16.1
Diphtheroid bacillus	3	1.3
Bacillus lactis aerogenes	2	0.9
Bacillus tuberculosis	1	0.4
Sterile	28	12.9

The large incidence of staphylococcus and streptococcus we attribute to the fact that they are very frequently found in the female urethra and trigone in cases that give no symptoms or physical findings of inflammation; a number of observers hold that these bacteria are normal inhabitants of these locations. Kelly states that more than one-half of normal individuals show bacteria in the urethra. Rovsing concluded that practically all bacteria concerned with the production of cystitis occur in a normal urethra. The colon bacillus was found as the predominating organism in most of the acute infections of the kidney and bladder.

Bacillus lactis aerogenes was found in pure culture in two instances; in one there was a double pyelitis contracted during pregnancy, which

proved very resistant to all forms of treatment, including lavage of the kidney pelvis with organic and inorganic silver salts, mercuriochrome, and vaccination with autogenous vaccines. She was under treatment a year and a half before we secured a sterile culture. The other case was one of acute cystitis and yielded with moderate rapidity to the usual treatment.

It is of interest to note that of the 162 cases, only 28 had sterile cultures when first seen.

The low incidence of tuberculosis is very noticeable. In only one case was the tubercle bacillus found. (It is worthy of note that this is the only case that presented the clinical picture of tuberculosis.) In this case the right kidney only seemed involved and the patient was operated upon at the Presbyterian Hospital. A nephrectomy was done and an uneventful recovery resulted.

Associated Conditions.—In a fairly large number of the patients referred for diagnosis, it was found after careful investigation that the urinary symptoms were largely dependent upon or resulting from various obstetric or gynecologic conditions, such as pregnancy, fibromyomata of the uterus, salpingo-oophoritis, senile vaginitis, and relaxation of the anterior vaginal wall with cystocele. There were 10 cases of cystocele, and in 7 of these there was an accompanying cystitis, as proved by positive cultures.

Diagnoses.—Cystitis, both acute and chronic, pyelitis, and chronic trigonitis were the most frequent diagnoses. Relaxation of the pelvic floor with cystocele and rectocele were also noted in a fairly large number of these patients.

It is worthy of note that this series does not bear out the often repeated contention of urologists that cystitis rarely exists without pyelitis. We think that this large incidence of primary cystitis is due to the number of cases in our series that were secondary to relaxation of the vaginal walls.

The following is a table of the diagnoses in the series of 162 cases:

Ac. cystitis	14	Cystocele	10
Ch. cystitis	31	Rectocele	5
Ch. unilat. pyelitis.....	21	Anteversio of uterus.....	2
Ch. double pyelitis.....	21	Retroversion of uterus.....	3
Bladder ulcer	1	Fibroid uterus	3
Renal calculus	1	Pregnancy	5
Stone left ureter.....	1	Ch. salpingo-oophoritis	2
Papilloma of bladder.....	2	Ch. endocervicitis	3
Renal tuberculosis	1	Ch. parametritis	1
Urethral caruncle	1	Ch. g. c. endocervicitis.....	1
Chronic skenitis	4	Menopause	1
Prolapse of urethra.....	1	Visceroptosis	1
Ulcer of urethra.....	1	Ch. right sacroiliac disease.....	1
Stricture of ureter.....	2	Psychoneurosis	1
Relaxation of pelvic floor.....	16	Unclassified	2

Operations.—There were five cases referred for operations on the urinary tract: two cases of papilloma of bladder, and one each of renal tuberculosis, stone in left ureter, and incontinence. Obviously this does not include the large number of cases operated upon for other gynecologic conditions.

Time under treatment varied from one day to seventeen months.

Results:

RESULTS:

Cases referred for operation upon the urinary tract.....	5
Cases discharged as cured.....	45
Cases improved	97
Cases unimproved	18
Cases lost track of or referred to other departments.....	7

CONCLUSIONS

1. A vast majority of the urinary disturbances in women are caused by infections of the urinary tract, most commonly caused by the colon bacillus.

2. In many of these the urinary symptoms are directly dependent upon, or greatly aggravated by, some definite gynecologic condition.

3. Our study showed that 3.25 per cent of all women applying to a gynecologic clinic needed urologic examination.

4. Seventy-five per cent of our cases were apparently benefited by treatment. (This is also shown by the fact that these patients, with hardly an exception, were very faithful in their cooperation and very grateful for the benefit they received.)

5. All gynecologic operative procedures should be postponed until any coincident infections of the urologic tract have been cleared up.

6. In the future we aim to pay more attention to the rôle of focal infections as a possible causative factor of infection in these cases.

7. Our findings and results as detailed above seem to us to demonstrate the necessity of a urologic department in a gynecologic clinic.

LARGE FIBROMYOMA OF CERVIX: CASE REPORT

BY FREDERICK CHRISTOPHER, M.D., F.A.C.S., WINNETKA, ILL.

(*Junior Surgeon, Evanston Hospital, Evanston, Ill.; Associate in Surgery, University of Illinois Medical School*)

FIBROMYOMATA of the cervix comprise some 5 per cent of all fibromyomata. Bland-Sutton¹ found the percentage to be 5 in 500 cases, and Crousse² found the percentage to be 4 to 5 of all operated fibromata (series of Quenu, Hartmann, Pedenat, Lee, etc.). These tumors are always single (Boyd³) but may occur simultaneously with fibromyomata of the body of the uterus. They may be interstitial or subperitoneal, and they generally arise from the posterior wall of the cervix. They grow downward so as to fill the vagina^{4, 5} or laterally into the broad ligament. One tumor² weighed as much as 4.5 kg. In Hall's⁶ case the tumor was of such size that it presented at the vulva, separating the labia more than two inches, and filled the pelvis with a hard immovable tumor. Guzot and Ichon⁷ report a gangrenous fibroma of the cervix seen in a case of prolapsus uteri. In Whitehouse's⁸ case of interstitial fibroid of the cervix a large vein was present which had ruptured into the cervical canal at the level of the external os and had almost caused a fatal hemorrhage. Giles⁹ reports the development of a large fibroid of the cervix after a subtotal hysterectomy.

Bleeding is generally the symptom first to attract attention, but there may be interference with micturition from pressure on the bladder or symptoms referable to pressure on the rectum.

Occasionally these tumors may be removed from below by myomec-tomy or piecemeal (morcellement). In the latter case, the dangers of hemorrhage are not slight. Laparotomy and total hysterectomy is the procedure of choice.

The following is the report of the author's case:

Mrs. L. C., aged thirty-seven years, had always had regular menstrual periods every twenty-eight days, lasting four to five days, with moderate flow and no pain; no children, no pregnancies. At the time of her last regular period a profuse flow started and continued daily in moderate amounts for three weeks. Physical examination was negative save for the presence of a large mass (about the size of a cocoanut) which could be palpated about 5 cm. above the vaginal orifice. This tumor was firm, round, and covered with smooth vaginal mucous membrane. The cervix could not be identified.

The patient was admitted to the Evanston Hospital on November 22, 1925, and was operated upon the next day, by midline abdominal incision. Traction on the small normal uterus showed the tumor to be attached to the cervix but to be relatively immobile in the pelvic outlet which it practically filled. The urinary

bladder was filled to demonstrate its relationship to the tumor and then emptied. The tubes and round ligaments were separated from their uterine attachment. The peritoneum was incised about the neck of the uterus and a cleavage plane was found between the tumor and peritoneum. It was not possible to continue the separation of this cleavage plane between tumor and the vaginal mucous membrane and accordingly the vagina was opened from above. The tumor and uterus were then removed in one piece. The vaginal vault was closed by a purse-string. Immediately after the operation there was moderate shock, which responded to hypodermoclysis. On the tenth day a sloughed portion of the vaginal vault was passed. From then on, save for the diminishing secondary anemia, the convalescence was uneventful. Eight weeks after the operation the patient was in excellent health and spirits.

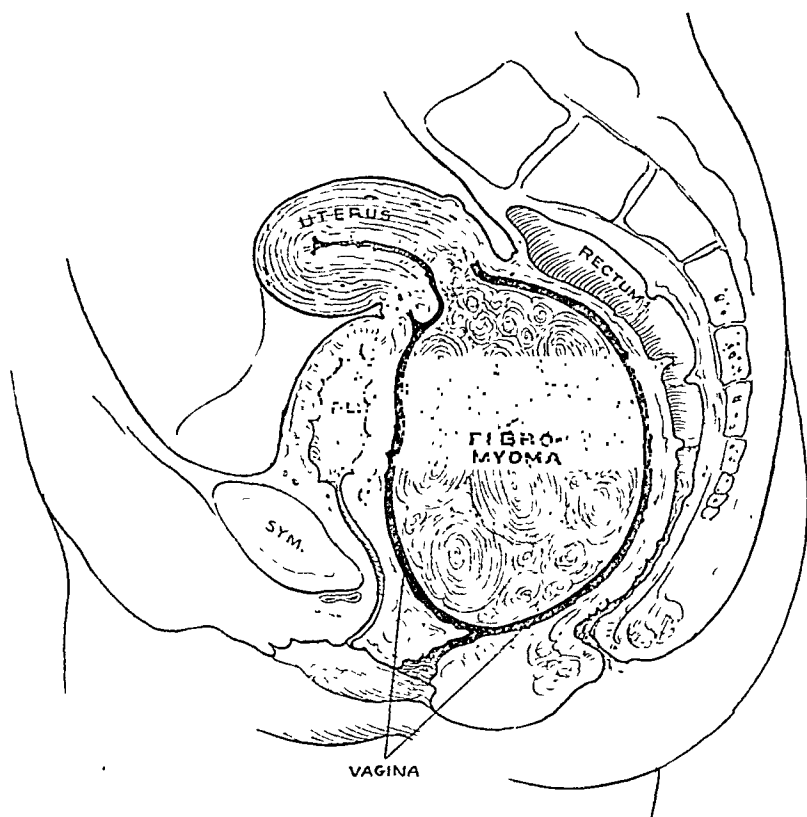


Fig. 1.—Diagrammatic representation of fibromyoma of cervix. The peritoneum was incised posteriorly at the junction of the body at uterus with the cervix, and an attempt was made to find the cleavage plane between the fibromyoma and the vaginal mucous membrane. As might be anticipated, the cleavage plane actually entered was that between the rectum and the posterior wall of the vagina. This danger is to be guarded against in any effort to enucleate a fibromyoma of the cervix from its mucous membrane covering by blunt dissection from above.

Pathologic Report.—(Dr. J. L. Williams).—A uterus 7.5 x 5 x 4.2 cm. with both tubes recently amputated leaving stumps 1 and 0.5 cm. long respectively, and with a large edematous oval mass 11.5 x 9.5 x 7.5 cm. attached to the inferior portion of the cervix. The external os opens on the anterior surface of this mass at its pedicle with a narrow slit 1.5 cm. long. The surface of the mass is coated with mucous membrane. The substance resembles that of an edematous fibromyoma. The lining uterine endometrium is pale, wrinkled, and edematous.

Microscopic sections of the tumor mass disclose the typical histologic structure of a fibromyoma containing areas of edema with necrosis.

Diagnosis.—Fibromyoma of the uterus with secondary degeneration.

REFERENCES

- ¹Bland-Sutton: Quoted by H. S. Crossen, *Diseases of Women*, St. Louis, 1922, C. V. Mosby Co., p. 559.
- ²Crouse, R.: *Gynécologie et Obstétrique*, Paris, 1922, v, 84.
- ³Boyd, Wm.: *Surgical Pathology*, Philadelphia, 1925, W. B. Saunders Company, p. 488.
- ⁴Barbet, P.: *Paris Chir.*, 1920, xii, 87.
- ⁵Sejournet: *Gynéc.*, Paris, 1923, xxii, 221.
- ⁶Hall, R. B.: *AM. JOUR. OBST. AND GYNEC.*, 1924, vii, 709.
- ⁷Guzot and Ichon: *Jour. d. Med. de Bordeaux*, 1923, iii, 165.
- ⁸Whitehouse, B.: *Jour. Obst. and Gynec.*, *Brit. Empire*, London, 1923, m. s. xxx, 211.
- ⁹Giles, A. E.: *Proc. Roy. Soc. Med.*, Lond., 1922-23, Sect. Obst. and Gynec., 12.
- 545 LINCOLN AVENUE.

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

THE DEVELOPMENT OF PRENATAL CARE IN DETROIT

By WALTER E. WELZ, M.D., DETROIT, MICH.

(Director Prenatal Clinics, Detroit Department of Health)

IN 1920 the United States Census Report showed a maternal mortality rate of 8 per 1000, the result of childbearing. During the same period in Detroit there were 50.3 stillbirths per 1000 living births, and 43 infants out of 1000 born alive died during the first month of their lives. The maternal death rate from childbearing in Detroit has averaged 6.75 for a number of years. This appalling death rate intimately associated with childbearing is sufficient to demonstrate that childbearing is a public health problem.

Up to comparatively recent date, prenatal care has been considered a branch of obstetrics, and its objective was mainly to reduce maternal mortality and morbidity. In Detroit the infantile mortality associated with childbirth as stillbirths and neonatal deaths, is thirteen times as great as the maternal mortality resulting from childbirth. The pediatrician has come to realize that over one-half of the deaths occurring in the first year of life occur during the first month. Most of these deaths are the result of conditions which prevail before the birth of the child. So it has been accepted by pediatricians, as well as health workers, that in order to reduce infant mortality appreciably, the causes of the high neonatal mortality must be sought and controlled through prenatal care.

The City of Detroit, through its Department of Health, is making an effort to decrease maternal and infant mortality which results from neglected pregnancy and delivery. This department, by direct action, and not merely by supervisory function, is reducing maternal and infantile mortality and morbidity among the indigent of the city. This work is unique in that the municipality assumes the responsibility for bringing live, healthy babies into the world for its indigent classes which are usually neglected at that time. Detroit is pointing a way to municipal preventive medicine for those of the childbearing period who would otherwise be neglected or receive only incompetent care.

In 1911 the Department of Health of the City of Detroit started a prenatal clinic in an effort to reduce infant mortality. The usual prenatal clinic is an outgrowth from an obstetric service, and its objective is mainly a reduction of maternal mortality and morbidity resulting from childbirth. In Detroit, the City Municipal Prenatal Clinic was established to combat the high incidence of stillbirths and neonatal deaths which result from causes which are active during pregnancy, and before aid can be given by ordinary baby care. Prenatal care here is properly a division of infant welfare, instead of an obstetric department as in other places. The work is done by obstetricians. The obstetric part of the work is not lost sight of, but the more important side of this work, infant welfare, is stressed according to its importance.

Prenatal clinics have been established by the city in various poor sections of the city. Today there are seven such clinics. The major part of this work is done at Station I, the largest indigent section.

In 1918 the Department of Health of Detroit provided a maternity pavilion in the Herman Kiefer Hospital. Thus the city has provided care for the indigent pregnant women from the time of conception, through pregnancy, delivery, and the postnatal periods. Over 1300 patients are cared for in this pavilion annually.

In this prenatal work an effort is made to individualize every case. The preliminary routine of family, personal, and obstetric histories, physical examinations, laboratory findings, including a maternal blood Wassermann, as well as the social and economic status of the prospective mother, gives an insight into the probable outcome of pregnancy. In the subsequent biweekly consultations the outlook, especially from the fetal standpoint, is clarified, and the needs of both mother and child stand forth in more distinct outline as the entire ego and environment of the mother become known. All the routine examinations in these clinics are made by physicians, not by nurses. As this work has proceeded, the importance of fetal rights and demands has impressed itself on us to a greater degree. As the possibility of attaining better results for the newborn was appreciated, the major part of this work has shifted to infantile prophylaxis, that is, reduction of infantile mortality and morbidity.

REDUCTION OF MATERNAL MORTALITY

In order to demonstrate the benefit to the community of prenatal care in the reduction of maternal deaths, Table I has been compiled. The maternal deaths due to childbirth in the entire city are compared with deaths from the same causes among women who have attended the city's prenatal clinics during the years 1922, 1923, and 1924. It will be seen that the maternal death rate from all causes following confinement for the entire city was 6.75 per 1000 deliveries, while among the women who attended the clinics, the rate was only 3.5 per 1000, a reduction of about 50 per cent. The clinics care for 6 per cent of all pregnant women in the city.

There is a group of maternal deaths classed as accidents of pregnancy and labor which is almost irreducible, even with good care. This includes intercurrent disease, hemorrhages, and accidents of labor. For the past three years the maternal death rate for this class in the entire city has been 2.33 per 1000 deliveries. The rate of 0.79 per 1000 resulted after prenatal care. In this class there is a possibility of greater reduction.

In the three year period there were four deaths from eclampsia among 5032 mothers cared for in the clinics. Prenatal care reduced this cause of death from 1.06 per thousand for the entire city to 0.79 per 1000 for clinic cases. Death from eclampsia was reduced 24 per cent, even though some of the clinic cases are not in complete control.

The greatest danger to the mother from childbearing is sepsis. Table I shows that 50 per cent of the maternal deaths from childbirth were due to sepsis. In the entire city the rate of maternal deaths from sepsis alone for these years has been 3.24 per 1000 births. Among the mothers who attended prenatal clinics, the rate was 0.79 per 1000 births. This reduction of 75 per cent in maternal deaths due to puerperal sepsis has been accomplished mostly through adequate provision for delivery for all clinic patients, and hospitalization for all abnormal cases. The reduction of the maternal death rate (almost 50 per cent) as the result of prenatal care is remarkable when the character of the patients is considered. These come from the poorest class and include over 12 per cent of mothers who have syphilis. Over 30 per cent of all mothers suffer from some marked physical abnormality, such as syphilis, tuberculosis, gonorrhea, cardiac lesions, toxemias, and pelvic contractions.

TABLE I
MATERNAL MORTALITY FOR ENTIRE CITY AND FOR PRENATAL CLINICS

	1922		1923		1924		TOTAL		DEATH RATE PER 1,000 CONFINEMENTS	
	CITY	PRENATAL CLINICS	CITY	PRENATAL CLINICS	CITY	PRENATAL CLINICS	CITY	PRENATAL CLINICS	CITY	PRENATAL CLINICS
Total deaths	186	5	196	5	207	8	589	18		
Puerperal sepsis	81	2	104	0	103	2	288	4	3.24	0.79
Puerperal eclampsia	34	0	26	0	34	4	94	4	1.06	0.79
Other puerperal causes	71	3	66	5	70	2	207	10	2.33	1.98
Rates per 1,000 confinements	6.8	3.1	6.7	3.1	6.8	4.2	6.75	3.5		

TABLE III
INFANT MORTALITY RATES FOR WHITE AND COLORED FOR THE ENTIRE CITY AND STATION I, 1923-1924

	1923				1924				1923-1924			
	STATION I		CITY AT LARGE EXCLUDING STATION I		STATION I		CITY AT LARGE EXCLUDING STATION I		TOTAL CITY		STATION I	
	White	Colored	White	Colored	White	Colored	White	Colored	White	Colored	White	Colored
Living births	331	772	26,267	810	389	848	28,131	1,132	68,680	1,620	54,398	1,942
Stillbirths	9	34	1,331	112	10	34	1,349	117	2,996	68	2,680	229
Total	340	806	27,598	922	399	882	29,480	1,244	71,676	1,688	57,078	2,171
Stillbirth rate	26.5	42.2	48.2	121.5	25.7	46.0	48.0	103.0	51.2	26.1	44.1	112.2
Neonatal deaths*	9	34	1,126	55	9	17	1,194	83	2,527	18	2,320	138.0
Death rate*	27.2	44	42.9	67.9	23.1	20.1	42.5	73.2	43.1	32	42.7	70.5

*Under one month of age.

REDUCTION OF MATERNAL MORBIDITY

It is impossible to state the exact rate of maternal morbidity following childbirth. It is estimated that morbidity sufficient to affect the health of the mother is five or six times as great as the number of maternal deaths. The morbidity results mostly from sepsis, laceration, and hemorrhage. As prenatal care provides adequately for delivery, lacerations are properly cared for, and seldom cause subsequent illness. As the death rate from puerperal sepsis can be reduced 75 per cent

TABLE II

INFANTILE DEATH RATES FOR ENTIRE CITY AND STATION I FOR THREE YEARS	1922 1923 1924 TOTAL			
	1922	1923	1924	TOTAL
Living births in city at large-----	25,910	28,114	30,500	84,524
Stillbirths in city at large-----	1,367	1,477	1,510	4,354
Stillbirth rate per living births in city at large -----	53	52.8	49.7	51.8 Av.
Living births of patients attended at Station I -----	1,037	1,060	1,237	3,334
Stillbirths of patients attended at Station I -----	33	43	44	120
Stillbirth rate per living births of patients attended at Station I-----	32	39	35.8	35.6 Av.
Neonatal deaths before one month of age in city at large-----	1,177	1,223	1,303	3,703
Rate of neonatal deaths before one month of age in city at large-----	45.4	43.5	42.7	43.9 Av.
Neonatal deaths before one month of age in cases attended at Station I-----	18	43	26	87
Rate of neonatal deaths before one month of age in cases attended at Station I-----	17	40.5	21	26.2 Av.
Deaths under one year in total city-----	2,276	2,466	2,380	7,122
Infant mortality rate per 1,000 living births total city (infants under one year of age)	87.7	87.7	78.2	84.5 Av.

through prenatal care, we may assume that there is at least as great a reduction in maternal morbidity resulting from sepsis. In each case postnatal examination at the termination of involution discloses any abnormal condition of the mother. We find that over 3 per cent of all patients have damaged kidneys, and these patients are given suitable advice and care. Provision is always made for adequate care of any morbid condition after delivery, thus lessening the number of mothers invalided as the result of childbirth.

REDUCTION OF STILLBIRTHS

To show the effect of prenatal care on infant mortality, Tables II and III have been devised.

During the years 1922, 1923, and 1924 there were 84,524 living births recorded in the city, and 4,354 infants were born dead. During the same period there were 3,334 living and 120 stillborn babies from mothers who attended Station I of the Department of Health. The incidence of stillbirths for the entire city during that period was 51.8 per 1000 living births, and 35.6 per 1000 for infants whose mothers had prenatal care. This was a reduction of 16 stillbirths per 1000 living births, the result of prenatal care.

There is a great difference between the rates of stillbirths and neonatal deaths among the colored and white infants. As 70 per cent of the attendance at prenatal clinic Station I is colored, it is necessary to separate the records of the two races to show the real decrease in infant mortality in each race as the result of prenatal care. Table III indicates the decrease of deaths among infants after prenatal care for each race for the years 1923 and 1924. This shows a reduction from

48.1 stillbirths per 1000 births for unattended white patients to 26.1 per 1000 births among those born after prenatal care. This is a reduction of 22 stillbirths per 1000 births among white infants, attributable to prenatal care. The incidence of stillbirths among colored infants in Detroit whose mothers had received no prenatal care was 112.2 per 1000 births. Among the colored infants whose mothers had received prenatal care there was an incidence of 44.1 stillbirths per 1000.

REDUCTION OF NEONATAL DEATHS

In the United States 50 per cent of the deaths of infants under one year of age occur during the first month of their lives. This important first month of infantile life is known as the neonatal period. Table II shows a reduction of 17 neonatal deaths per 1000 births as the result of prenatal care.

In order to understand the real benefit of prenatal care in the reduction of neonatal deaths, it is necessary to separate the white from the colored race.

Table III shows an incidence of 42.7 neonatal deaths per 1000 births among the white infants whose mothers had no prenatal care. For the same class who had prenatal care the neonatal death rate was 25.1 per 1000 births. This shows an actual reduction of 17 neonatal deaths per 1000 among white infants.

Among the colored infants whose mothers had no prenatal care, there was an incidence of 70.5 neonatal deaths per 1000 births. Those colored infants whose mothers had prenatal care had an incidence of 32 neonatal death per 1000 births. This shows a reduction of neonatal deaths among colored infants of 38 per 1000 births.

The high incidence of death among colored infants corresponds with that shown by the birth statistics of the Bureau of Census of the United States. The causes of the high rate in this race are the high incidence of lues and prematurity, as well as ignorance in the care of the newborn. The decrease in infant mortality among colored infants in this clinic points the way to a general reduction in infant mortality in the United States by means of prenatal care.

CONTROL OF INTERCURRENT DISEASES IN PREGNANCY

Over 30 per cent of all women attending these clinics have some intercurrent disease or abnormality which might affect mother or child or both adversely, so all maternal diseases are diagnosed prenatally and cared for as soon as possible. Renal, heart, and lung diseases, syphilis, gonorrhea, and the various infections are treated as early as possible because of their effect on pregnancy, as well as their influence in producing premature or stillborn infants. Patients with appendicitis, cholecystitis, pelvic infections, syphilis, and pulmonary infections are hospitalized at once because of the adverse influence of these diseases on pregnancy. Not infrequently are scabies or pediculosis found, and the field nurse discovers several members of the family suffering from the same condition, for which the entire group is treated.

Both clinic and field nurses are constantly on the lookout for contagion in order to control it before it can spread or endanger the expectant mother. In the recent smallpox epidemic in Detroit every patient in the prenatal clinics was vaccinated. It was discovered that 50 per cent of the colored women, who had recently come from the south, had never been vaccinated. Because of this neglect in public health service, vaccination has been made a routine for all new patients who have not been successfully vaccinated within five years.

CONTROL OF SYPHILIS

During the past four years 5,440 pregnant women were cared for at Station I of the Department of Health. Seven hundred seventy-eight (14 per cent) of these were syphilitic. The high incidence of this disease is due to the fact that the

majority of the clinic cases are colored women. It was possible to follow 670 (86 per cent) of the entire number of luetic mothers through pregnancy, labor, and postnatal periods to six weeks after delivery when the final postnatal examination of mother and infant was made.

Almost all of these luetic mothers came to the clinic with no subjective symptoms, and did not know they were luetic. History, taken carefully, has shown that the syphilitic mother has averaged more than two stillbirths or miscarriages because of her infection before her condition had been diagnosed. Fifty-six per cent of all luetic mothers give positive luetic histories. Even with negative blood Wassermann report, 14 per cent of these syphilitic mothers were diagnosed by means of history and physical findings. Blood Wassermann tests are made on all women on admission to the clinic. In suspicious cases with a negative blood Wassermann test, provocative blood Wassermann, spinal fluid Wassermann, and luetin tests are made. Recently the Kahn precipitation test is used as an adjunct to the blood Wassermann test to verify doubtful cases.

As soon as a positive diagnosis of syphilis is made, the expectant mother is sent to the Venereal Clinic of the Department of Health for intensive treatment with arsphenamine. This is done regardless of the period of pregnancy. It is desirable to diagnose and treat syphilis in the pregnant woman within the first sixteen weeks of pregnancy, as it is believed that transmission occurs only through the placenta and a minimum of three months is required for that transmission.

TABLE IV

BABIES BORN FROM SYPHILITIC MOTHERS 1921-1924 IN STATION I,
5,440 DELIVERIES,—778 LUETIC (14%)

	NO TREAT- MENT	AT LEAST ONE COURSE OF TREATMENT	TOTAL
Living births -----	311	244	555
Stillbirths or miscarriages-----	93	22	115
Total -----	404	266	670
Infantile death rate per 1,000 births-----	230	82 Reduction	148

Table IV shows the results of the attempt to control syphilis through maternal transmission during the years 1921-1924, inclusive. Of the 670 syphilitic mothers whose records were complete during these four years, 404 had either no treatment or inadequate treatment because of delinquency or late admission to the clinic. These gave birth to 311 living infants, and there were 93 miscarriages or stillbirths. This is a primary infant mortality of 230 per 1000 births. Two hundred and sixty-six pregnant women had at least one course of antiluetic treatment, consisting of a minimum of three neosalvarsan and eight or more mercury injections. These gave birth to 244 living babies at or near term, and 22 miscarriages or stillbirths occurred,—a primary infant mortality of 82 per 1000 births. It must be explained that many of these mothers did not have as complete treatment as they should, but as complete as possible, following late clinical admission or delinquency in treatment. In spite of this, there was a definite reduction of 148 infantile deaths per 1000 births among syphilitic patients as a result of treatment during pregnancy.

In fifty-one stillbirths which occurred in the third period of pregnancy (twenty-eight to forty weeks' development), only three of the mothers had had treatment. There were only seven miscarriages (sixteen to twenty-eight weeks' development) among those who had had a complete course of treatment, consisting of a minimum of six arsphenamine treatments.

Cord Wassermann tests are obtained as far as possible as a check on primary

infantile infection. Seventy-three per cent of babies of syphilitic mothers gave a positive cord Wassermann test because of inadequate, or no maternal treatment.

Among the colored mothers who have attended the clinic there has been a reduction in the incidence rate of syphilis. This reduction is attributed to cures among mothers who have returned for care subsequent to being treated in previous pregnancies.

From clinical experience it can be stated that the transmission of syphilis from mother to fetus can be prevented by early and adequate maternal treatment, started in the first period of pregnancy (under sixteen weeks). This points the way to the eradication of hereditary syphilis.

But adequate prenatal care does not end with the attempt to prevent transmission of syphilis to the newborn. It teaches the mother the dangers of syphilis, the possibility of transmission, and the need of treatment to produce a cure. The other members of the family, especially the husband and children, are referred to clinics for diagnosis and care. Always the mother is given an explanation of the disease as far as she can understand, and the danger of transmission is pointed out to her.

TOXEMIA OF LATE PREGNANCY

Marked cases of toxemia of late pregnancy average from 3 to 4 per cent of all cases. The rather low incidence of this condition is due to the effect of prenatal control. Quite often a woman who has had renal toxemia in one pregnancy shows little toxicity in the next pregnancy because of early control in clinic care. The deaths are uniformly due to carelessness on the part of the patient or loss of clinical control. In cases of severe toxemia, an effort is always made to persuade the patients to have hospital care. The infantile death rate in cases of severe toxemia is uniformly over 200 per 1000 births, even with good supervision. The placental changes and maternal toxemia are the causes of this high infantile death rate. It is doubtful whether this can be reduced materially with the best of prenatal care. With good cooperation of patient, clinic, and hospital, the maternal mortality should be almost zero, as it is in private practice.

HEART LESIONS

In Station I of the Department of Health during the past two years, 211 (6.6 per cent) of 3,186 pregnant women were found to have heart lesions. Most of these women had never had a thorough physical examination before, and most of them had never had either a diagnosis or any instruction as to the hygiene necessary to prolong life.

There was a primary infant mortality of 8 per cent, the result of maternal heart lesions. There were two maternal deaths from heart lesions, and two mothers died suddenly several months after delivery.

In the early diagnosis of maternal heart lesions, with careful supervision during pregnancy, and proper provision for delivery, both infantile and maternal mortality are reduced. The greatest value to the community in prenatal care of women suffering from heart lesions is the diagnosis of the conditions and of patient instruction in the care of their health subsequent to pregnancy.

TUBERCULOSIS

In three years 39 tuberculous women were discovered in 4,520 pregnant women. This incidence of 8.6 per 1000 is high, due to the fact that a number of tuberculous women are referred to this clinic from the Tuberculosis Clinic of the Department of Health. In this group there were no maternal deaths, though there were three fetal deaths. This gives a primary mortality of 77 per 1000 births in tubercular mothers. No therapeutic abortions were performed. Most of these patients were

admitted in the second trimester of pregnancy. It is believed that there is greater danger to the mother from an induced miscarriage than from a normal delivery at term. The expectant mother who is tuberculous is provided with nourishing food, rest in bed, and hospital delivery. By conserving maternal vitality through pregnancy, a material decrease in infant mortality has resulted. After the care given them during pregnancy, a number of tuberculous mothers have increased in weight and improved in health, in spite of childbearing. The child is not allowed to nurse, but care is taken to supervise food and hygiene of the infant from the time of birth.

CONTRACTED PELVES

It is a question whether pelvic contractions are a greater source of danger to mother or to child. Certainly the infantile mortality resulting from this abnormality is many times greater than the maternal. However, the high incidence of maternal morbidity resulting from undiagnosed and improperly cared for pelvic contractions is one of the urgent reasons for adequate prenatal care. In Station I almost 5 per cent of all mothers had pelvic contractions sufficiently marked to make normal delivery of a mature fetus problematical. All of these are forewarned of the possibility of a difficult or operative delivery. Adequate provision is made for hospital delivery, and the hospital is given the report of conditions found. Of the 2,462 mothers who could be traced in the past two years, there were found only four primary infantile deaths in 136 instances of contracted pelves. Among these there were two maternal deaths, one from pneumonia and one from sepsis following abdominal cesarean section. There were two cases of parametritis in this group. There was no permanent morbidity among the mothers as the result of delivery in cases of pelvic contraction.

PREMATURITY

During two years 41 premature infants died in the neonatal period. This is 60 per cent of the total 68 deaths in this period. Almost half of the neonatal deaths of premature infants were due to syphilis. So, the principal means of reducing neonatal deaths is by the prevention of premature births. This is done by the treatment of syphilis, control of toxemia, effort toward the prevention of infections, providing proper nutrition for the mother, as well as lessening her work during the latter months of pregnancy, and preventing conditions generally which tend to induce premature labor.

BREAST FEEDING

Breast feeding is essential for the newborn infant, especially the premature or sickly one. Many mothers have the idea that substitutes for breast feeding are as good as breast milk, and the bottle is an easy way of shirking the responsibility of breast feeding. This is frequently disastrous to the infant, often resulting in malnutrition and sometimes in death. Prenatal care teaches the expectant mother the importance of nursing her baby, and that breast milk is the best for her child. It also teaches her how to prepare her breasts for nursing. All mothers from the prenatal clinics start nursing their babies after delivery. Only those with insufficient or poor milk are changed to formula feeding. This is done under medical supervision, usually from a Department of Health Baby Clinic. The reduction of deaths in the neonatal period is due to the high percentage of breast feeding as much as to anything else.

NUTRITION

The importance of this subject to both mother and child is so great that it cannot be emphasized too often. A pamphlet on prenatal care is given each prospective mother. This contains general instructions as to the best diet during pregnancy. But

no list of instructions can be complete enough to cover all phases of nutrition and diet during pregnancy, so in these clinics individual instructions are given by the attending physician as the condition demands.

In early pregnancy proper nutrition is essential in controlling hyperemesis. In the last eight thousand prenatal cases at Station I, no therapeutic abortion has been advised for hyperemesis gravidarum. This was largely the result of proper dietary instructions. The majority of toxemias of late pregnancy can be controlled through diet and elimination. In the clinic toxemia in the majority of cases is held in control through a properly directed diet. So also the reduction of infantile deaths in toxemias of late pregnancy is due mostly to dietary regulation which permits pregnancy to continue to a time when a viable child can be born.

IMPORTANCE OF PRENATAL RECORDS

The proper tabulation of records through prenatal clinics is essential in obtaining knowledge of the causes and prevention of maternal and infantile mortality and morbidity. Such records are essential for the study of the health of the individual, and as a benefit to public health. In our records 100 per cent of all births following attendance at the municipal prenatal clinics are registered, whether they are living infants or stillbirths; whereas in the entire city only 95 per cent of all births are registered. In the clinical records, pregnancies terminating before the end of sixteen to twenty-eight weeks of development, and in which the fetus is 16 to 35 centimeters long, are classed as miscarriages. Pregnancies terminating between twenty-eight and thirty-eight weeks are called premature deliveries. Infants born dead after twenty-eight weeks of development, and with a length of more than 35 centimeters are classified as stillbirths. It is believed that this classification will ultimately be used for both birth and death records, as it is accurate, and such records based on accurate measurements will serve to aid in the analysis of health statistics. While the neonatal period is accepted as the first four weeks of life, our clinics use six weeks for the period of tabulating the last infantile records of prenatal care. As the last examination of the mother is made at the termination of involution six weeks after delivery, it is easiest to examine and record the infantile condition at the same time.

Tabulation of death and morbidity records at six weeks after delivery is completed whenever possible. The mother is given a complete examination to finish her record, as well as to advise her as to her condition. The result of the cord Wassermann test is recorded, except when it is neglected in home delivery. In the case of infants who die or are stillborn in the hospital, autopsy findings are recorded. An effort is always made to secure and record a definite cause of death, whether in abortion, miscarriage, stillbirth, or neonatal death. As far as possible an effort is made to learn whether the cause of infantile death antedated delivery or whether death was the result of delivery, or neglect in the neonatal period. Also the relation of antenatal pathology to fetal death or morbidity is noted. Any congenital or acquired abnormal condition of the infant is noted, and the child is referred to the proper agency for care.

Complete records are being made of the prospective health of the individual even before his birth. This is a stable foundation for the health registration of the individual. All subsequent health supervision must be based on this first and most important record which antedates birth and extends through the most dangerous (neonatal) period of life. Eventually a health pedigree will be worked out for the individual, starting at the prenatal record, going through infantile, preschool and school records, to further records to be made at maturity. Already the prenatal records have been used by physicians and clinics in the care of the child who has had prenatal supervision.

HEALTH COOPERATION

In the care of the expectant mother, cooperation is necessary with all other agencies which may be of service to her or her child. The most common need is dental care, as over 80 per cent of all women attending prenatal clinics in Detroit require immediate dental service. So far as possible these women are referred to the nearest dental clinic for care. All tubercular women and those in whom the disease is suspected are sent to the nearest tuberculosis clinic for diagnosis and care. Those needing hospitalization are placed in sanatoria as soon as possible. Patients with venereal diseases are sent at once to the Municipal Venereal Clinic for care. Patients requiring surgical care are sent to a Receiving Hospital as occasion directs, and those in need of medical treatment are sent to various hospitals for care. Patients who are able to pay are referred to private physicians. Those who can afford to pay a small fee are sent to private hospitals for delivery. Indigent patients are delivered at the Herman Kiefer Hospital, a municipal institution. All necessary information is sent with each case. Those living outside the city are referred to visiting nurses or the Red Cross for home care. In every possible way cooperation is perfected with every health agency in the city and state. Not only is effort made to give the individual expectant mother the best possible health supervision during pregnancy, but every agency which may be of service to her health or that of her unborn child is brought to her aid in every way that necessity directs.

SOCIAL SERVICE

The health of the individual depends largely upon his social and economic status. To secure health during pregnancy, and healthy progeny, these conditions must be known, and if necessary, aid must be given to secure proper care and environment. For this purpose social service is needed among the poor. In Detroit prenatal clinics, proper nutrition, clothing, and home conditions are provided. Also proper delivery conditions are secured and minor children are cared for while the mother is in the hospital.

Cooperation is extended to every social service agency which may help the expectant mother. In Detroit twenty-four agencies are in cooperation with the prenatal clinics in the effort to aid the mother during and following this period. Agencies which protect the illegitimate mother or the deserted mother are of great value in protecting and promoting the health of mother and child.

EDUCATION IN PRENATAL CARE

The prenatal clinics of the Department of Health of Detroit register 6 per cent of all pregnant mothers in the city. Of course, many of these commence attendance so late that proper supervision is not possible. Also a number of registered mothers are lost on account of their leaving the city or moving. Actually about 4 per cent of the expectant mothers of the city receive adequate prenatal care through these clinics.

As only the indigent class attend, the number will never be great. But as the results of the care given in these clinics can be compiled, they must be used to demonstrate the value of such care. Besides the good they accomplish for the expectant mothers and infants among the poor, these clinics should be considered as laboratories in prenatal care, the results of which are to be used as guidance by the large percentage of women of the more fortunate classes who employ physicians.

It is estimated that approximately 20 per cent of the expectant mothers of Detroit receive adequate prenatal care. These include the wealthy who pay for and receive good care during pregnancy, and the poor who attend free clinics. The 80 per cent who receive inadequate or no prenatal care belong to the great middle class of working people, the fathers being mostly factory workers who can pay for

this care. The reason that this 80 per cent is neglected in pregnancy is twofold: neglect on the part of the family physician and negligence on the part of the expectant mothers.

As prenatal care is of recent origin, many of the older physicians are not familiar with its advantages and methods of procedure. The Detroit Obstetrical Society is trying to correct this professional neglect by giving the general practitioner education on this subject through the County Medical Society. The medical students of the Detroit College of Medicine are given intensive training in prenatal care at Station I.

In order to educate the neglected 80 per cent of expectant mothers, the Mother-Daughter Association of Detroit has agreed to work with the Detroit Obstetrical Society in holding meetings to inform women of the advantages of prenatal care and the care an expectant mother should receive from her physician. The Mother-Daughter Association includes almost all women's clubs in the city. During the year 1925, speakers from the Detroit Obstetrical Society spoke on prenatal care to over 1,300 women at eighteen meetings. During the same period of time nine talks by members of the Council of the Mother-Daughter Association were given to over 1,100 women to urge prenatal education for all parents. Also, copies of "The Prospective Mother in the House of Health," issued by the American Child Health Association, were sold to prospective mothers at these meetings.

The Detroit Community Union has appropriated funds for the year 1926 to cover the expenses of furthering educational work in prenatal care through the Mother-Daughter Association.

The Detroit Obstetrical Society has issued an outline for a talk for its members to use when speaking to women's clubs. This gives detailed information as to the advantages of prenatal care, and the speaker urges his audience to make use of modern prenatal care from the onset of pregnancy.

COMMENT

Prenatal care is in its infancy. When properly understood and generally followed, it will be the greatest aid in making childbirth safer for mother and child. The objective of the medical profession should be to train its members to give modern prenatal care, and to educate all people as to the benefits of this care. There must be close cooperation between the medical profession and the public in the furtherance of prenatal care. Lay organizations are necessary to induce the public to demand good medical care during pregnancy. More and better maternity hospitals are needed to provide modern facilities for childbirth for women who have had adequate prenatal care.

Society Transactions

AMERICAN ASSOCIATION OF OBSTETRICIANS, GYNECOLOGISTS, AND ABDOMINAL SURGEONS

THIRTY-EIGHTH ANNUAL MEETING

HOT SPRINGS, VA., SEPTEMBER 16, 17, AND 18, 1925

DR. ASA B. DAVIS OF NEW YORK, PRESIDING

(Continued from April)

A paper on **Ligation of Inferior Vena Cava**, was read by DR. O. G. PFAFF, INDIANAPOLIS, IND. (See page 660.)

DR. JOHN F. ERDMANN, NEW YORK CITY, read a paper on **Diverticulitis of the Colon**. (See page 609.)

DISCUSSION

DR. CHARLES GORDON HEYD, NEW YORK CITY.—Diverticulitis occurs much more frequently than we suppose. Many x-ray pictures show a multiplicity of diverticula. Many of them do not progress to infection or ulceration.

In regard to the colon there are two very interesting physiologic facts which might point to the prominence of diverticulitis in the region of the sigmoid. The first is the presence of a nodal point at the junction of sigmoid and upper rectum which acts as a controlling mechanism for sigmoidal movement. At this level there is a normal stasis of material and the effect of spasm at this nodal point would be dilatation of the sigmoid and descending colon. The second physiologic fact is that these cases occur preponderantly in the obese. Whenever fat is laid down in the individual there is always an excess of fatty deposit beneath the fascial structures and in the periarterial tissues. An excess of fat beneath the submucous layer would represent a weakening of that layer and the passage of blood vessels through a weakened submucous layer might result in diverticula under any increase of intraluminal pressure.

While true diverticula are found from the pharynx to the anus and are probably always congenital, false diverticula presuppose some mechanical factor that weakens the integrity of the submucous layer and allows protrusion or eversion of the mucous membrane.

The symptomatology of diverticulitis is ordinarily progressive. The first phase would be disturbance of function with irritability from retention of fecal material within the diverticula. The second phase would be the effect of perforation and the recognition of symptoms that come from extravasation of intestinal material into the peritoneal cavity. The third phase would be the stage of development of symptoms of obstruction.

Necessarily, the treatment is correlated with the stage of pathology that is exhibited. In the stage of irritation the patient probably demands very little treat-

ment. The habitual cleansing of the bowels or the normal daily evacuation are sufficient to maintain the drainage of the diverticula into the colonic tract. In the stage of perforation we have essentially the treatment of intraabdominal abscess. This treatment embraces surgical drainage and such local repair as is possible. The moment obstruction intervenes we are dealing with an entirely different proposition. Surgery of intestinal obstruction represents first the attempt to save life by removal of the obstruction and providing a means for evacuation of the obstructed bowel. Complete obstruction of the gastrointestinal tract means early death and the outstanding surgical indication is conservation of life by providing for the drainage of the alimentary contents. The reconstruction of the alimentary canal comes later and is a conservative operation and not life-saving.

I recall a case of a negress with a huge pelvic tumor which was diagnosed as sarcoma. A colostomy was done and the unfortunate patient was dismissed with the idea that she hadn't long to live. Four years later she came into the dispensary and said she was tired of having a colostomy and asked if we could close it. We *did so and found that she had an entirely normal pelvis. There is no question, in the hypercritical review of the case, that the woman had had a perforating diverticulitis.*

We have operated and drained an abscess on the left side and have not been sure of the origin of the infection and considered it as an occasional left-sided appendicitis. Now our students are taught that "left-sided appendicitis is a perforating diverticulitis." It is a much more common condition than we have heretofore realized.

The prognosis is dependent upon diagnosis and reconstruction of that portion of the intestinal tract, and the condition is always associated with a very guarded prognosis, for what happens in one location may happen at a subsequent date in another area of the colon.

DR. WM. W. BABCOCK, PHILADELPHIA, PA.—It is curious that the profession has been so slow in appreciating the pathologic condition of diverticulitis. It is said that the late Dr. Hayes Agnew used to take some of his friends to see a man who had the curious condition, as he thought, of passing gas by the urethra; and this condition was viewed with the greatest interest as a surgical curiosity. Dr. Agnew apparently had no conception of diverticulitis. Most of us as students heard or read nothing of diverticulitis. *The American Textbook of Surgery*, which we studied, was edited by two well-known Philadelphia surgeons; and in this book no reference was made to diverticulitis and yet, both of these authors later developed the condition. Both were operated upon with intestinal resection and both recovered from the operation. One, some years later, died with secondary malignant involvement of the spine; the second, had a nonmalignant type and fortunately is still living. These were among the earlier cases reported by Dr. Mayo. Our largest encyclopedia of medicine and surgery had no reference to this condition. The editor, also a noted Philadelphia teacher and author, had diverticulitis and was operated upon.

A fourth Philadelphia physician, a professor of therapeutics, also had the disease and thus had the matter first brought forcibly to his attention.

From the paper and discussion made here, it is evident that the disease has repeatedly afflicted doctors. Years before his operation, one of the afflicted surgeons had written what was to me a peculiar article advocating the universal use of the bidet as a most necessary article of the toilet. Now we can understand that it was the early symptoms of diverticulitis that inspired the doctor's pen. Here is a condition that may develop suddenly with acute, peritoneal manifestations, that the physician usually mistakes for a typical form of appendicitis; or it develops a little less acutely with obstructive symptoms, or very frequently as a chronic condi-

tion with progressive ulceration and perforation of other adjacent organs, particularly the bladder.

A patient of middle age who gives a history of passing gas or feces with the urine should at once make us think of a chronic perforative type of diverticulitis, for this is one of the few things that produce such perforation. Of course, perforation occurs with malignancy and other inflammatory conditions, but diverticulitis is a very important cause. It is surprising that these patients will walk about and may continue to walk for weeks and even months, despite the chronic perforation. One of the doctors I mentioned went about doing his work for months and later, we found a perforation in the bladder, and in fact, multiple perforations involving other portions of the intestines. Another doctor that I saw also had the slower type of perforation and thought he might be developing a hernia. He noticed a lump in the left groin which gradually became more tender and bothered him when walking about, although he continued his practice. The diverticulum had adhered to the abdominal wall and was slowly perforating into it.

The treatment is like that of any of the similar conditions involving the large bowel. With some of the chronic adhesive complications it may well test the skill of any surgeon. I know of nothing that may be as difficult as any operation upon one of these chronic forms of diverticulitis, where everything is fused by the densest possible adhesions. The problem of operation attaches a most important and serious one. A prolonged dissecting operation, with the idea of cutting out a portion of the sigmoid or colon and making an anastomosis may jeopardize the life of the patient. Often a palliative operation is best.

If the sigmoid can be liberated, a loop may be first brought out and, after adhesions have formed, excision and later restoration of the continuity of the bowel is to be thought of. In some cases, the adhesions and perforations are so deep in the pelvis that one cannot well bring out the portion that is involved, and then one has to consider a very difficult and dangerous operation of the anastomotic type with the possibility of secondary leakage; or a temporary colostomy; or artificial anus with the hope of later restoring the lumen of the bowel.

DR. JAMES E. DAVIS, DETROIT, MICH.—This condition does occur most frequently in the individual of the fat type, but I am convinced that it also occurs in the atonic type, and the elderly individual who is poorly nourished, who has a condition of general atony, or perhaps only local atony. I do not believe that this occurs only in the fat individual because it does occur, as Dr. Erdmann has reported, in young children. These children, in my experience, are poorly nourished, and the muscles of the intestinal tract are very poorly developed as well as the neuromuscular apparatus. The myenteric plexuses are difficult to find; there is quite an uneven distribution in their size.

I am very sure that the evidence seems to point to the fact that this is a congenital condition usually, but I am also persuaded that it can be acquired. When of the latter type, it is a neuromuscular, neurovascular or an atonic condition usually.

DR. JOHN O. POLAK, BROOKLYN, N. Y.—While this does not refer really to diverticulitis, I understood Dr. Erdmann to make the statement that he operated on acute pus-tubes, and in closing I would like him to state what the justification is for doing that, or if he makes his decision in accordance with the type of infection with which he is dealing?

DR. JAMES E. KING, BUFFALO, N. Y.—I would like to add one possible symptom to this interesting question of diverticulitis. A man 68 years of age entered in the hospital, on the medical service. During the last few days of his life he had a diarrhea and it was reported that in the diarrheal stools there were a number of

small fecal concretions which could not be accounted for. At postmortem it was evident where they came from; his entire colon was studded with diverticula, some of them being empty and some filled with these concretions that Dr. Erdmann has spoken of. Possibly a careful study of some of these cases where such a condition might be suspected, would show the presence of these concretions in the stool and a diagnosis might thus be made.

DR. ERDMANN (closing).—In regard to Dr. Morris' statement, I have not had any unusual adhesions in these cases. I simply remove the focus, whether it be a pus focus or a chronic thickening, draining as short a time as possible, and the results are very good.

Diverticulosis is shown by x-ray. There is hardly a day when we do not see a patient who is being treated for some other definite lesion, having the diverticula show up. Many times while operating, too, we find diverticula throughout the abdomen. I feel that the majority of operations for this condition are in the fat individuals.

As to the stools containing small concretions, they are evidently from these diverticula, because often when operating we have found diverticula in the colon, containing small lumps, which will disappear without any difficulty just by manipulating the organ; in other cases they will not. It might be suggested that in the presence of such stools an x-ray should be taken.

DR. A. J. RONGY, NEW YORK CITY read a paper on **Oviduct Insufflation: A Study Based upon 400 Cases.** (See page 616.)

DISCUSSION

DR. JOHN O. POLAK, BROOKLYN.—While this procedure is of great diagnostic confirmatory value, it is not free from danger. I, too, have had severe cases of syncope following the procedure. These tests should not be done as routine in the office. It is a definitely surgical procedure, and premorphinization adds very materially to the facility with which it may be done. Not infrequently the interstitial portion of the tube, running as it does through the musculature of the uterus will shut down and no gas passes at 200 under the first pressure. Then it is well to stop and not repeat the test. In a little while, the gas will pass through at a pressure of 120 perhaps. In other words, there is the same come-back in that voluntary muscle that there is in any other structure that is assaulted.

It is unwise to tell any woman after you have been unable to pass gas through the tube that she cannot become pregnant. I have had the chagrin this year of receiving three letters from patients telling me they had come a great distance to get my opinion and to learn that their tubes were closed, and that later a country physician had with little treatment succeeded in making it possible for them to become pregnant.

These tubes that we are inclined to take out during the acute stage may get well later, and I have seen women supposed to be sterile who have borne children, after 18 to 20 years.

Another point I want to impress is that no case with cervical discharge should be insufflated.

The doctor said, I think, that no operation on a cervix cures sterility. The exception is the immense vaginal hypertrophies; in those cases amputation does cure in a fairly large number of cases.

I would call attention to the value of Kennedy's work which is the injection of a substance into the uterus and tubes and then the x-ray picture locating the point of obstruction. Personally, I cannot see any advantage in salpingostomy. It is

better to tie a piece of catgut around the tube and nature takes care of it better than the plastic procedure; those are the only cases in which I have gotten satisfaction.

DR. WM. A. COVENTRY, DULUTH, MINN.—I have done about 250 cases of insufflation in the office. I began with the more complicated apparatus of Rubin but have now abandoned it and use a simple air insufflation, without gas or oxygen. I use an ordinary bladder irrigation syringe that holds about 30 to 40 c.c. of air, a silver post-urethral catheter with a rubber tip on it, of course, following all the precautions.

I have had only one case that has given me any trouble, and that was a post-insufflation complication, where the preliminary examination of the pelvis was not as carefully done as it ought to have been.

DR. ROBERT T. MORRIS, NEW YORK CITY.—I would like to ask Dr. Rongy if a small degree of patency may allow us to anticipate extrauterine pregnancy? For example, I do not take out the tubes in pyosalpinx; I split them lengthwise, drain, and some months later cut the tubes loose from the abdominal wall. The oviduct will then be found to be sound again and sometimes new fimbriae have developed. In some of those cases I have told the patients they were likely to have extrauterine pregnancy.

DR. CHARLES L. BONIFIELD, CINCINNATI, OHIO.—I rise to discuss not so much insufflation, but the problem of sterility. As one of the speakers has said, it is not a very simple matter; there is a lot we do not know about it.

Dr. Rongy said one thing with which I cannot quite agree—that if you pass a sound of a certain size through the cervical canal, that demonstrates that there is really no obstruction that would prevent spermatozoa from going up. The mucous membrane is very similar to that which lines other cavities. When you have a bad cold, you can pass a sound up your nose but the air will not go through. The mucous membrane becomes edematous and while air will not go through, you have no difficulty in getting a sound through. Every doctor knows he has cured many cases of sterility by getting the uterine cavity in a healthy condition, by curetting and improving the drainage. At least, pregnancy occurred afterward, whether that was the cause of it or not, and that is about all you can say about any treatment.

A few months ago I operated upon a young married woman, otherwise healthy, for a cyst of the ovary about the size of a grapefruit. The operation was done expeditiously and with as little trauma as possible. Six months later—that is, on the twentieth of July—while I was away on my vacation, she had a tubal abortion. On my return home I diagnosed her case and removed the blood clots through a vaginal incision. This patient had a living child about a year old.

Another case that occurred within the last six months was a woman who had never been pregnant. I removed a somewhat larger cyst for her. Her general health improved very much for about four months, when she, too, had a tubal pregnancy which I operated on after abortion, through a median abdominal incision.

Why these patients should become pregnant in the tube, I cannot explain.

DR. BURNLEY LANKFORD, NORFOLK, VA.—The probability has been suggested of a plug of mucus being able to close the cervix to such an extent as to prevent fertilization taking place. It seems to me there must be some other factor. Most of those cases that I have seen have been cervixes that are widely open. The spermatozoon is very active and mucus is its normal habitat and if it is in a healthy condition will surely go against the stream! There must be some other cause of obstruction than a simple plug of mucus. However, if Dr. Rongy has some better plan of removing the mucus, than the cautery knife, I would like him to enlarge upon that.

DR. HENRY SCHMITZ, CHICAGO, ILL.—We use a very simple apparatus in tubal insufflation which consists of an ordinary blood pressure apparatus. A Y-shaped tube is attached to the uterine cannula, by one end, to the other the manometer, and to the third the airbulb. The uterus will tolerate 15 c.c. of gas or air. It is not necessary to have more than 30 c.c. of gas at one's disposal to make this test. By using the manometer the pressure is absolutely under control and the exact pressure of air can be determined that is necessary to force gas through the tubes. Insufflation of air may cause a spasm somewhere in the canal. To overcome this the insufflation is preceded by the administration of 5 minims of belladonna every two hours for several days.

The great number of patients with apparently closed tubes has surprised us, though repeated examinations soon after cessation of the menstrual flow are made. We often find at operation that the tubes are patent by using the Curtis method of forcing the air from the fimbriated extremity down into the uterine cavity which is the natural and physiologic route.

The catheter is supplied with a three pronged sleeve which holds the cannula air tight against the cervix. During operation air may be forced up and its escape observed at the fimbria. If air does not pass, the Curtis method is used and in quite a number air escapes easily down into the uterus.

DR. JAMES E. DAVIS, DETROIT, MICH.—The microscopic examination of oviducts gives abundant evidence of the wonderful reparative powers of these tissues. It is perfectly amazing what repairs are observed in tubes that have passed through the most severe types of infection, and after the repair is complete you will find hardly any evidence of what has gone before.

DR. RONGY (closing).—I want to say that I thoroughly agree with most of the speakers that oviduct insufflation is at the present, only a diagnostic procedure, and helps us very little from a therapeutic standpoint.

Dr. Polak stated that the only indication for cervical operation is a vaginal hypertrophy of the cervix. I still cannot help but think that even when the cervix is hypertrophied we should let it alone.

I do not agree with Dr. Coventry that these patients should be insufflated in the office.

It is advisable to have an assistant listen over the abdomen for the escape of gas through the tubes, and this is difficult to carry out in an office.

I don't believe we can anticipate ectopic pregnancy. I do not think the question of gas passing through the tubes will in any way have any bearing upon ectopic pregnancy.

Dr. Bonifield has said that a swollen mucous membrane of the cervix may permit the passage of a cannula and yet not permit the passage of a spermatozoon. I cannot see the logic of that. The fact that many women become pregnant after an operation upon the cervix of one form or another doesn't prove anything. You will find that a number of surgical procedures have been given up, which were thought to be of a curative nature for the time being. I do not see how a splitting of the anterior and posterior lips can in any way help to cure sterility.

Dr. Lankford spoke of the cervical mucous plugs. In a large number of instances they may not prevent the passage of spermatozoa, yet they may act as a barrier and it is well to have them removed. I have no other method of treatment for these cervical discharges than by the electric cautery, but following this treatment you will find that the discharge is practically cured. I don't think we have a better method. For spasm of the tubes we used to use morphine and scopolamine but I

intend to use belladonna in the future. I think if it is used over a period of forty-eight hours before the examination it may help a great many of these cases.

All of us who have practiced in a hospital for any length of time must agree with Dr. Davis that the reparative process of the tubes is at times amazing; general surgeons have really no conception of pelvic pathology. All of us have seen tubes that have been swollen; then later resolution took place and some of the women became pregnant. Operations on the genital organs of these young women must be delayed as long as possible. We must realize that a conservation of the tubes and ovaries can be accomplished much better during the chronic stage than during the acute stage.

(To be continued.)

THE NEW YORK OBSTETRICAL SOCIETY

MEETING OF NOVEMBER 10, 1925

THE PRESIDENT, DR. O. PAUL HUMPHSTONE, IN THE CHAIR

DR. E. A. BULLARD read a paper entitled **The End-Results of Operations for Uterine Prolapse at the Woman's Hospital 1915-1925.** (For original article see page 623.)

DISCUSSION

DR. W. E. STUDDIFORD.—It is a difficult thing to draw positive conclusions from the histories of that number of operations. The first table shows one of the great difficulties; namely, the adequate description of the character of the prolapse. It also shows another thing, that, with the exception of Table X, in which there is a series of only four cases, every type of operation gives a certain percentage of failure. I think that is the experience of every one who has done any large amount of work in this class of cases, and while infection may be responsible for a certain small percentage of bad results, the usual cause is a badly-selected type of operation for the individual case. It means that that case was not studied as to the causative factors and what the condition was which should be repaired. Of course, it is very difficult to get a result which is one hundred per cent perfect, because you are dealing with women who have bad tissues to repair. A woman who is thin has the potentialities of a hernia in almost any part of her body. She is one type of case that will almost always get a prolapse. She may get a prolapse even if she never has a child, and if she does have a child she is the type of woman that very often has a precipitate labor; she will have a labor in which everything is forced out and the uterus is down shortly after the first pregnancy. They are a very bad type of case to handle and one of the most difficult types in which to get a complete repair.

I also was interested to hear that the Watkins operation is not entirely successful. The Watkins operation is easy to do. It means opening the anterior culdesac and if an operator is careful and pushes the bladder up through the peritoneum and pulls the uterus up and sews it to the anterior wall, he has cured the prolapse, and that is the end of it. If he subsequently has to do a cesarean section in one of those, he is not so enthusiastic; or if at a later date he removes from the bladder a gauze pad that was forgotten when there was a little bleeding during the Watkins operation.

The Watkins operation has a distinct indication in a certain type of case, a case in which haste is possibly an indication, such as in an elderly woman who has a prolapse, but one thing must be present if the operation is to be a success; there must

be very little prolapse of the posterior segment; the sacrouterine ligaments must be still holding. When an enterocele follows the Watkins operation one can be pretty sure that he did a very poor operation at the start.

I am glad to see the doctor present this because there have been papers read in the past, in which some one type of operation was recommended with one hundred per cent of cures. Now, there never was an operation for prolapse of the uterus that would give one hundred per cent of cures.

DR. GEORGE G. WARD.—This work emphasizes the great need and import of having an efficient follow-up system and real records.

The one thing that strikes me as of great interest in his charts is that the percentages of successes are so high. I really was very much surprised, as I had no idea that his research would show that there was such a high percentage of satisfactory results.

The fact that you cannot promise a cure in all cases was brought well to my mind this afternoon. I had an operation for so-called complete procidentia—the entire anterior vaginal wall was out, the cervix was out, and the uterus was about four inches in depth, in a woman at the time of the menopause. It was simple enough to do the Mayo operation, but when it came to restoring the pelvic floor, which is very essential for success, difficulty arose because the patient evidently had had a severe forceps delivery in the past. The vaginal walls on both sides, in either sulcus, were densely adherent to the bone and it was impossible to lift up the posterior segment of the pelvic floor in order to bring it up against the anterior segment. I dissected away the tissues from the scar to the best of my ability and got approximation, but after I had finished there was a gap of at least one inch between the anterior and posterior segments, and there was no way that I knew of whereby I could overcome that condition. I made a note when I dictated that operation that there probably would be a partially satisfactory result, because of the inability to bring the posterior segment of the pelvic floor in its proper position up against the anterior segment. This case is mentioned merely to show that no one can say that he has an ideal operation which can be applied to every case that he has in hand.

DR. HALSTED.—In looking over the prolapse cases operated upon at Sloane Hospital for the past two and a half years, I found the third most common symptom was incontinence of urine. I feel that this is very important and we should make a special effort to cure the incontinence when we operate on these cases. It apparently is cured by most of these operations automatically, but I do not think it is aimed at often enough individually.

Another thing in regard to the Watkins interposition operation, is that the uterus should be small. I see a good many of these cases in the cystoscopic clinic after operation and find that if the uterus is large it comes down into the region of the trigone, and not only does it distort both ureteral openings, but I have seen three cases where the patients had absolute incontinence and there was no way of curing this incontinence because the uterus was sewed down so that it held the urethra open, by encroaching on the internal sphincter. The only way in which these cases could possibly be helped would be to dissect out the uterus and remove some or all of it, and this would be very difficult.

DR. GORDON GIBSON.—To my mind the most important thing in the cure of the condition is the attention to the pelvic fascia. If you are going to get a good idea of procidentia you have to forget the uterus entirely. The uterus comes down because its supports are relaxed and it should be regarded in the same light as a hernia.

It is not because you do a vaginal hysterectomy that you cure procidentia of the uterus; it is because it is no longer there to become procident. It is the work that

you do on the broad ligaments, and on the anterior vaginal wall, that holds the rest of the vagina up, and unless you do that you will get prolapse of the vagina. Those of you who have seen Watkins operations fail, where everything has become procident afterwards, realize what a bad condition you have to contend with, and it is not simply because of the fact that the uterus is brought down between the bladder, and the vagina that keeps it up, but it is the work done on the anterior vaginal wall, bringing the overstretched ligaments and fascia together in front of the cervix.

DR. W. P. HEALY.—It is very interesting in looking over the statistics of the different types of operation to note the unanimity with which three out of four of the cases succeeded despite the type of operation which was used. There was about 75 per cent of success with any type of procedure. At the same time, I think it is very interesting that we are now able to get 75 per cent of success with almost any type of worth-while operation, because I am quite certain that up to 1915 we were not so successful in the treatment of procidentia uteri.

There are recorded in this list, according to my study of these figures, only 16 total failures out of 360 operative cases which is an encouraging feature, as the work was done by thirty different operators. Therefore, the treatment of uterine prolapse is beginning to be reasonably well standardized, and the selection of operative procedures is being done with a good deal of judgment. It indicates that we realize that uterine prolapse cannot be treated by any one type of operative procedure.

DR. BULLARD (closing).—I am obsessed with the importance of complete fascial correction, whether the uterus be retroverted or anteverted. If the fascial correction is complete, all about the cervix in particular, the uterus will stay up; it is the fascial hammock that must be faultlessly correct under the bladder, about the cervix, in the culdesac, and in the posterior vaginal wall.

Apropos of what Dr. Halstead said about the necessity of using the Watkins operation only in cases having small uteri and of the vesical irritability that he has seen, somebody once cystoscoped many bladders after the Watkins operation and found just what I have shown in this series; namely, the bladder distortion with much vesical irritability of one sort or another.

OBSTETRICAL SOCIETY OF PHILADELPHIA

MEETING OF DECEMBER 3, 1925

THE PRESIDENT, DR. BROOKE M. ANSPACH, IN THE CHAIR

DR. GEORGE GRAY WARD, of New York (by invitation), delivered an address on **Radium Treatment of Cancer of the Uterus**. (For original paper, see page 439, April issue.)

DISCUSSION

DR. FLOYD E. KEENE.—It is a source of satisfaction to realize that Dr. Ward confirms the opinions which we of Doctor John C. Clark's Clinic hold regarding the use of radium, not only as applying to the technic of application, but also as to the results of treatment. We have limited ourselves to 100 milligrams of radium element and have had no experience with the emanations. When we first began this work, every case of carcinoma of the cervix was treated, irrespective of the extent of the disease, with the exception of the very early cases which were sub-

jected to operation. Our experience has taught us, however, that care should be exercised in the proper selection of cases; while it is true that occasionally a very advanced case of carcinoma of the cervix will show a marvelous cure, we must not be judged by one case but rather by the results obtained from a large series, and with the advanced case with wide extension involving the bladder, rectum or broad ligaments, we believe that radium may do more harm than good. The technic we have employed has been practically identical with that used by Doctor Ward. Formerly, a second dose of radium was applied six weeks after the first as a more or less routine procedure. Of late, however, we have been governed entirely by the results of the first treatment as to whether or not a second is advisable. It has been our opinion that beneficial results of radium have come largely from the first treatment. As Dr. Ward has said, following upon irradiation there is an encapsulation of the cancer cells by a fibrosis which renders them more inaccessible to the action of radium, and secondly, such tissue is poorly resistant and may readily break down, giving rise to a fistula formation if too much radium is used. Dr. Ward's suggestion that a permanent catheter be introduced and kept in place during the time the radium is being applied is a very excellent one and I believe that in this way many distressing bladder symptoms will be avoided. I think there is no question that radium is the treatment *par excellence* for the more advanced cases of carcinoma of the cervix in that it diminishes bleeding and discharge and even pain in a large percentage of cases. In about 15 per cent there seems to be an exaggeration of symptoms, while in 65 per cent there will be a local healing with complete cessation of hemorrhage and foul discharge. Such palliation may last for months or even years before recurrence. In classifying our cases of carcinoma of the cervix, we follow much the same plan as that recommended by the American College of Surgeons. Doctor Ferguson, who was formerly on our service at the University Hospital, has just finished a compilation of our cases treated since 1919 and of these 184 have been examined by one of the members of our Staff. Of this number, 94 have passed the five-year interval. One point which Dr. Ward did not mention is the use of cautery excision of the malignant cervix. In this series above referred to, there were 28 patients in whom a cautery amputation was done who were treated five years or more ago. Of this number, there were three deaths: one from peritonitis and two from septicemia, giving an operative mortality of a little over 10 per cent, but with a five-year cure of a little over 42 per cent. Of the Group I cases which were treated five years or more ago there were 13,—7 of these were treated with radium alone with two five-year cures or 28.5 per cent. High cautery amputation plus the radium was used in 6 with five five-year cures or 83 per cent, giving a total five-year cure in the 13 early cases either by radium alone or by high amputation plus radium of 53.8 per cent. While, of course, this series is too small upon which to base any definite conclusion, it seems to us that it does indicate that the best results are to be obtained from a combined use of the cautery and radium. We are in full accord with Dr. Ward's idea that a hysterectomy should not be done following an apparent cure by radium and for the reasons which he has so definitely pointed out. As to carcinoma of the fundus, we believe that operation should be done unless some very definite contraindication exists. Of those patients with carcinoma of the fundus in whom for some reason or other radium was used, about 20 per cent are alive and apparently well after five years.

DR. RICHARD C. NORRIS.—The 50 per cent definite cure is disappointing. It would be in any other class of medical or surgical cases. You speak of the general practitioner making an early diagnosis. We must have some other method of early diagnosis of carcinoma, before we blame him too severely. We can only urge him to make no attempt at diagnosis. Any suspicious case should be submitted to the expert for a biopsy. The pity is that as soon as the patient *thinks* something is

wrong, it is too late for radium or surgery to effect a cure in one-half of such cases. Suppose carcinoma is diagnosed by an early biopsy and radium is applied, how far does it radiate and destroy? Has every outpost of cancer been reached? How far does the surgeon go with his operation, even the Wertheim? Clark showed the hopelessness of removing outlying glands. It is a hopeless problem, as the results both of radium and surgery demonstrate and we must have light from another source. The cautery, so skillfully used by Dr. Byrne, of Brooklyn, with no better results since, is to be improved by applying radium. Will that also destroy all cancer outposts? I fear not. I agree with Dr. Hirst not to forget surgery for these very early cases, that happen not to have outposts of cancer cells. If it can be shown that radium's effect is not direct, but inhibits cancer change through some as yet unknown biologic change in the blood or other tissues, then I will have more hope for its ultimate success. As to the technic of inserting radium needles, a recent mishap is worth noting. Applying a needle with silk attached for its withdrawal, the silk was cut by the trocar and cannula used and the needle lost itself in the tissues. Foreign bodies are difficult to remove sometimes. To remove this needle it was necessary to have an x-ray picture, a block-tin stem pessary having been placed in the cervix. A stereoscopic picture oriented the needle in the posterior wall of the uterus midway between the promontory and the symphysis. With the patient on a fluoroscopic table, the needle was finally grasped and removed.

I have since that accident abandoned the silk withdrawal thread and the cannula and trocar. The needle threaded with a fine wire is held in a forceps and thrust into place.

DR. ALFRED HEINEBERG.—To me the most important point brought up has been the very close follow-up work of these cases. It is only by following up the cases closely that we can hope to have the excellent results which have followed Dr. Ward in the treatment of carcinoma. I would like to give you a report of the cases which we have radiated in the Gynecological Department of Jefferson Hospital since we have adopted intensive radiation in the last four years. The 86 cases we have are not sufficient, nor has sufficient time elapsed since the beginning of this treatment to come to any definite conclusions as to the effect of radiation in these cases. There is one other point which has been brought out, which has also been emphasized by the Germans; namely, the blood picture before the application of radium. He also brings out another point which we have neglected to a large extent in this country; namely, that twice as many patients recover after the x-ray treatment whose living conditions are satisfactory, as do among those who must go back to work or to other conditions which are not favorable for the recuperation.

DR. WARD (closing).—I have followed the work of Dr. Clark's Clinic with the greatest interest, and I knew that they were using the cautery to remove tissue when exuberant but I did not know that they had adopted it as a routine technic. I think that it may prove a valuable contribution. We likewise consider the constitutional state of the patient a very important factor and use prophylactic blood transfusion on that account. We must realize that we are likely to forget what has been done in the past. Dr. Byrne's high cautery amputation of the cervix showed wonderful results in those early days.

DR. CATHARINE MACFARLANE read a paper entitled *Infection of the Abdominal Incision in 500 Gynecologic Laparotomies*. (See page 630.)

DISCUSSION

DR. EDWARD A. SCHUMANN.—Observation in many clinics and many varieties of operative procedures have led me to believe that the preparation of the patient, the method of operation, and method of wound closure have nothing whatsoever to

do with wound infection. In any well conducted clinic infections from the outside are in the great minority. The controlling factor is traumatism to the edge of the incision. I believe the moving retractor in the hands of assistants is a very important factor in producing wound infection, and I would advise a fixed retractor so tension is regulated by the operator or is not shifted.

DR. FRANCIS A. FAUGHT (by invitation) read a paper entitled **Blood Pressure and Urinary Findings in 100 Cases of Normal Pregnancy.** (See page 633.)

DISCUSSION

DR. RICHARD C. NORRIS.—The frequency with which you find albuminuria varies; some place it as high as 80 per cent. Catheterized specimens and the delicacy of the test employed influence the frequency. Moderate albuminuria may be due to associated leucorrhea, to cystitis, or to pyelitis. It is important to know that you are dealing with renal albuminuria. You will find the Esbach test, from day to day, will tell you how the case is progressing and that, after all, is the important thing. It is the study of the case day by day as to the progressiveness of the combined symptoms of toxemia. As to glycosuria, the Doctor did not say how many of these cases were really lactosuria and not glycosuria.

The chart shows that it is the combination of symptoms, not casts alone or blood pressure alone, that is important. Eighty per cent of pregnant women will show a systolic blood pressure between 100 and 130, the larger number nearer the lower range. The laboratory findings of acetone, diacetic acid and indican; the precise number and kind of casts; amount of urine voided, and the test of kidney efficiency are all valuable, but laboratory findings do not always explain what they find. When, with these findings, we note a rising blood pressure and progressive symptoms of grave toxemia, the patient has entered the danger zone. It is the progressively rising blood pressure, the progressive degree of albuminuria with failing kidney function and diminution in the amount of urine voided in twenty-four hours, and the other signs of toxemia, such as headache, itching of the skin, nausea, irritations throughout the body—the many complex manifestations of toxemia—that call for immediate treatment which is best carried out in a hospital. When the patient gets a blood pressure of 160 without associated kidney changes, we feel she is in the danger zone. We put her to bed and study the various functions of her body with every available laboratory aid.

The chart, page 694, of 33 cases of grave toxemia in 1200 consecutive hospital patients (Preston Retreat) is of interest. First, the period of occurrence of grave toxemia cases with only one as early as the sixth month. Toxemia in the early months is the nausea and vomiting type. Six occurred in the sixth to eighth month, twenty-one in the eighth to ninth month, only five of them at term. This chart indicates the period of pregnancy when one should especially frequently examine the urine and blood pressure of pregnant patients. While once a month may do in the earlier months, more frequent examinations are in order after the seventh month. A specimen sent for examination is not enough. The patient should be seen; her blood pressure taken, her body functions studied, her diet and elimination looked into, and advice given as to her mode of life.

Of these 33 cases, after appropriate eliminative treatment, 17 of them went into labor without doing anything to end their pregnancies. We induced labor in 16 cases, 3 from seventh to ninth month and only 4 at or about term, showing again the dangerous period. In the first group there was an average of eighteen days' treatment, before spontaneous termination of pregnancy occurred. Of that group of spontaneous labors, none died. In the second group (induced labors) one died from fulminating eclampsia. She had attended the prenatal clinic, with normal urine and

PRESTON RETREAT, PHILADELPHIA
SUMMARY OF THE LAST 1200 CONSECUTIVE PATIENTS, GRAVE TOXEMIA, 33 CASES

PERIOD OF OCCURRENCE	RANGE OF BLOOD PRESSURES	DEGREES OF ALBUMINURIA	ONSET OF LABOR SPONTANEOUS, 17 INDUCED, 16	AVERAGE DAYS TREATMENT PRIOR TO DELIVERY	MATERNAL DEATHS	INFANT DEATHS	ECLAMPSIA
1 6th month 6 7th to 8th mo. 21 8th to 9th mo. 5 at term	155-225	1-7 grams per liter	3 7 to 8 mo. 9 8 to 8½ mo. 4 at term	18 15	0	5	0
					1 (Fulminating Eclampsia)	4	3

Albuminuria, 180 cases of all patients
Albuminuria (1-7 grams per liter) with high blood pressure (155-225 systolic)—28 cases
High blood pressure not associated with albuminuria (no maternal or infant mortality)—4 cases
Moderate albuminuria not associated with high blood pressure
Maternal mortality (of grave toxemia)
Infant mortality (of grave toxemia)
Occurrence of eclampsia, 1 in 400 patients. Frequency reduced 50 per cent by prenatal clinic.

15 %
2.33%
.33%
12.33%
3.33%
27.22%

normal blood pressure, on four occasions. Three days after her last visit she felt well enough to go to the movies, came home, had a violent headache, was brought to the Retreat in an ambulance, having had six convulsions with profound coma, and died in about ten hours, never regaining consciousness. She was delivered within an hour by bag and forceps, the infant stillborn, from premature detachment of the placenta. That kind of case we cannot avoid. Fortunately they are very rare.

In this group of cases nine infants were stillborn—five after spontaneous premature labor, four after induction of labor. We cannot save so many babies, but we do save the mothers. At Preston Retreat, before we introduced the prenatal clinic, the frequency of eclampsia was one in about 200 patients. Occurrence of eclampsia in the last 1200 patients is 1 in 400. That reduction alone justifies prenatal work—the prevention of eclampsia.

As to high blood pressure without albuminuria and casts, there were 4 such cases all occurring within a week of term. We induced labor in three of them. Blood pressures were 175-162-174. There is a patient in the Hospital now with blood pressure of 170. She has no albuminuria, she has lost one of her kidneys, she has lost the right lobe of the thyroid gland operated a year ago for goiter. Her kidney is not failing her. Her high blood pressure is probably due to hyperthyroidism.

The relative value of these two factors—albuminuria and high blood pressure—is debatable. To estimate the gravity of toxemia the urinary studies are more to be relied upon. When both are progressively growing worse, despite active eliminative treatment, termination of pregnancy is indicated regardless of the viability of the fetus. A gravely toxic mother usually means a gravely toxic, premature fetus, whose questionable viability is not to be put in the balance with the mother's life.

DR. FAUGHT.—Dr. Norris' remarks are a supplement to my paper, since they are purely complementary to what I said, dealing entirely with the toxic type of cases, while I eliminated all those in which any suggestion of toxemia appeared and made no reference to them. Certainly we find variations in blood pressure in all individuals, in some more than others. I have made observations where the pressure was between 165 and 175 mm. Hg. systolic at the first observation and never found it again more than 140, so I have always said that individual blood pressure readings were notoriously misleading and have always been in the habit of checking them up.

THE NEW ORLEANS GYNECOLOGICAL AND OBSTETRICAL SOCIETY

MEETING OF DECEMBER 10, 1925.

DR. HILLIARD E. MILLER reported a case of Macerated Premature Twins with Six True Knots of the Cord.

The patient was about six months' pregnant and in labor. About four inches from the umbilical attachment of the first fetus there was a coil of knots of the cord. Immediately afterwards the foot of the second fetus presented. Delivery was accomplished by extraction. Both fetuses were dead and macerated, and there was distinct evidence of hydramnios. The second (smaller) of the twins seemed to be further along in the stage of decomposition than the first (larger). Careful examination of the cord showed six true knots tied therein.

The patient later gave me a rather interesting history. This was her second pregnancy, the first child being now some eleven months old. She is a very active girl and indulges in all sorts of athletics. About a month before this occurrence she had gone to her father's plantation, where she had done considerable horseback

riding, and had personally supervised the branding of 400 cattle. For about ten days before her labor she had not felt life, but for a week prior to this cessation, the activity of the fetuses was so pronounced that she had no rest at all. This seemed to bear out our assumption that the strangulation of the cord of the smaller twin had occurred first.

DR. J. W. NEWMAN read a paper on *The Mechanics of Birth Injuries, Their Cause and Prevention*, prepared jointly with Dr. Walter E. Levy (see page 645).

DISCUSSION

DR. WALTER E. LEVY.—Holland, in his monograph on the subject, reports 300 consecutive autopsies on stillborn fetuses of every type, and his thesis is issued as the official British Ministry of Health report. Intracranial hemorrhage is handled better in it than it is in the average textbook. He calls attention particularly to the anteroposterior pressure which causes the lateral compression and the lateral pressure which causes a lengthening of the anteroposterior diameter. In routine autopsies on every stillbirth on our service, we have found three intracranial hemorrhages in 14 stillbirths from all causes. Our present article deals merely with the mechanism of birth injuries and the general aspects of their prevention. I believe we cannot emphasize too strongly the teaching of the mechanism of labor and also the fact that when we resort to version or forceps, we are simply trying to imitate the natural mechanism of a delivery and are not trying to substitute a new procedure for it. The teaching that midforceps deliveries can be done in five minutes is utterly wrong. Munro-Kerr long ago called attention to the fact that the average midforceps delivery takes at least thirty minutes. It should imitate the natural methods of labor by alternate traction and relaxation, and so should give the head a chance to mold and the vagina time to iron out.

DR. E. L. KING.—I agree with Dr. Newman that the key to success lies in handling each individual case on its own merits, refraining from blind adherence to routine. One of the most difficult problems in obstetrics is the decision when to apply forceps, and one of the most difficult performances in the same field is to refrain from applying them too soon. I try to impress upon my students the difficulties of forceps deliveries by telling them that, roughly, the danger of such a delivery varies as the square of the distance from the head to the vulva. That is, I try to emphasize that the further the head is from the vulva, the more difficult is the application, and certainly the more dangerous. Both in teaching and in practice I try to refrain from applying forceps in any instance until the head is well down, but I have seen numerous cases in which the application was delayed too long, and the child was either born dead or died soon afterwards. One of our prominent obstetricians once remarked that he did not believe that the prolongation of the perineal stage ever caused a baby's death. I disagree absolutely. I think in this connection it is wise to stress again careful and frequent auscultation of the fetal heart, particularly when there is a delay in the delivery, and more particularly in any instance in which the position is posterior or in which the sagittal suture is in the transverse diameter and the head has not yet rotated anteriorly. Unlike Dr. Newman, I feel that in certain instances of breech presentations extraction is indicated, particularly in frank breech cases, when the legs are straight up in front. This is especially true of primiparae with large babies, in which there is a larger bulk to come through the pelvic canal than it can readily accommodate. In these instances, when the diagnosis is definite and dilatation is complete, I think it wise to bring down a leg and to proceed with a slow extraction. I also believe that occasionally, when the delivery of the aftercoming head is too slow, the application

of forceps is a wise measure. Here, too, however, it is essential not to put the forceps on too soon and try to hurry the delivery. The head must be past the sacrum, down in the cavity, and the sagittal suture must have rotated anteriorly. Much less damage is done by this measure than will be caused by traction from below and pressure from above.

DR. NEWMAN (closing).—I am glad to hear Dr. King emphasize also the dangers of a prolonged perineal stage; the average textbook almost ignores this condition, which is certainly responsible for a fair percentage of our fetal deaths. It should be stressed, however, that the worst thing in the practice of obstetrics is the use of the watch. We should govern our procedures by the indications, and not by the fact that the patient has been in labor a certain period of time.

DR. H. VERNON SIMS read a paper on **Malignant Degeneration of Uterine Leiomyomata** and reported three cases.

CASE 1.—C. G., aged forty-two years, colored female. Admitted to the hospital with a tentative diagnosis of fibroid of uterus. Past history irrelevant, menstrual history normal until present illness, which began six months ago with gradual onset. Now has severe lower abdominal pain, worse during periods, and profuse leucorrhea and metrorrhagia. No fever or vomiting. Onset apparently dated from miscarriage in June of the previous year. Operation, supravaginal hysterectomy. Pathologist's report, malignant leiomyoma. Recovery.

CASE 2.—A. H., aged forty-three years, colored female. Admitted with a complaint of pain in side and bleeding at irregular intervals for last seven or eight years, growing progressively worse for last two months. Menstrual history normal until five years ago, since which time periods have lasted from five to fifteen days or more and have recurred after six to fifteen days amenorrhea. Five children, youngest twenty years old. Tentative diagnosis multiple fibroids, size seven months' pregnancy. Hb. 50 per cent. Operation, supravaginal hysterectomy, left salpingo-oophorectomy, appendectomy. There was nothing to arouse the suspicion of malignancy except the friable condition of the fibroid, which was so marked that the vulsellum tore out repeatedly. Pathologist's report malignant leiomyoma, atrophic and cystic endometritis, chronic proliferative salpingitis. The patient died on the fifth day postoperative.

CASE 3.—L. J., aged sixty-four years, colored female. Past history irrelevant. Menopause eight years ago. Nine full-term deliveries, youngest child nineteen, one abortion. Indigestion and loss of weight for several years. Eight months ago noticed irregular spotting, which has continued since, and is now accompanied by backache and a foul discharge. Hb. 65 per cent. Diagnostic curettage revealed tissue apparently grossly malignant. Pathologist's report fibrosarcoma. Laparotomy six days later. The uterus was about the size of a four months' pregnancy with irregular, nodular areas which suggested malignancy both in color and appearance. There were some minute areas on the intestines which were vaguely suspicious. Complete hysterectomy, bilateral salpingo-oophorectomy. Pathologist's report malignant leiomyoma of uterus, very rapidly growing. Previously reported from scrapings as fibrosarcoma, but sections selected from tumor show cells arise from smooth muscle and not from fibrinous tissue. Good recovery.

DISCUSSION

DR. T. B. SELLERS.—Statistics from various medical centers showing the relative frequency of malignancy complicating uterine myomata, emphasize the necessity of a careful macroscopic and microscopic examination of all tumors removed at

operation. I cannot explain why our incidence is not higher at Charity Hospital; I remember only one case on our service for many years past. I have used radium in many selected cases of uterine fibroids with excellent results, but if malignancy occurs as frequently as some authors insist that it does, I question the advisability of its use, in view of the fact that it is not the ideal treatment for malignancy of the uterine fundus.

DR. HILLIARD E. MILLER.—In our very active service at Charity Hospital, only three cases of malignant changes have been reported within the last ten years, while in other clinics the incidence runs as high as 4 per cent. This seems to indicate that possibly our specimens are not being examined with the detail they should be. Dr. Sims' statement that these conditions are likely only during the menopausal years or thereafter should be qualified. They occur in younger women also. I recall four or five cases in our private practice in which malignancy was found in young women, including one instance in which diagnostic curettage revealed it in a woman of twenty-eight, in whom we had not suspected any such condition. Any irregular bleeding, or any irregular blood-tinged discharge, should be regarded with suspicion whether the patient be twenty-five or seventy.

DR. SIMS (closing).—Personally, I believe a more careful examination of the specimens is indicated than is usually done, and I think the higher incidence of malignancy in clinics in which careful examination is the rule will prove my point. Cullen's clinic in Baltimore, for example, reports a comparatively high incidence. He is looking for the condition and he finds it. We apparently are not looking, and we, therefore, do not find it. In the last case reported, both the gross and the microscopic findings were perfectly characteristic of the condition. We ought to insist that every suspicious area be thoroughly examined. I did not mean to convey the impression that malignancy of the fundus of the uterus occurred only at or after the menopause. Indeed in my own experience I recall at least one case in which it occurred in a woman of thirty. In the cases I investigated, however, it occurred in all instances either at or after the menopause, and that was the point I meant to bring out.

DR. ADDLEY H. GLADDEN, JR., read a paper on **The Conduct of Labor After Cesarean Section** (see page 642).

DISCUSSION

DR. PHILIPS J. CARTER.—Rupture of the cesarean scar is due to one of two things. Infection is the first cause, not necessarily an obvious infection, but the low grade type which produces practically no clinical symptoms because the toxins are absorbed as they arise. The second cause, and it is a most important one, is the type and kind of suture material employed, plus, of course, technic, and the resistance of the uterine muscle to the sutures. When we suture in tiers and include the entire musculature of the uterus, we sometimes pull the sutures too tight, and when we do, a breaking down of the muscle is almost sure to follow. In the scars which give way you will always notice that rupture occurs where the scar is thinnest. I recall assisting in one operation in which the imminent rupture could be detected abdominally beforehand, and when we opened the abdomen we found the scar as thin as paper. Tying the sutures too tight will cause strangulation of the muscle fibers of the uterus and is dangerous. I cannot give a personal follow-up on any of my own cases of former cesarean, but in several instances at the hospital I have heard indirectly of some of these cases being delivered safely afterwards by natural channels. I believe interrupted sutures are the safest. It is my practice to use about a dozen chromic No. 2 sutures, running through all the layers,

including the endometrium, and all interrupted. Then I go over the top with a Cushing suture. In that way the first line is completely covered. If infection does occur, only a few sutures may be involved and not the entire line.

DR. W. E. LEVY.—I should like to report six cases, which are possibly included in Dr. Gladden's figures, which I have personally delivered by the natural channels after a previous abdominal section. Of course in no case was the first operation done for contraction. In the average case in the clinic we had to take the patient's word for it that the previous convalescence was smooth or stormy, so that we could decide upon the possibilities of a previous infection. We delivered all these cases in the hospital, and in more than one instance the operating room was ready in the event that rupture did occur. I recall delivering one woman twice *per vaginam* after cesarean section. The second stage of labor should be made as short as possible in all these cases. The woman who has had her first baby by cesarean section is for all practical purposes a primipara, and the delivery meets as much resistance from below as if it were her first child. Four of my cases, as I recollect, were terminated by forceps as soon as these could be safely applied, that is, after full dilatation had occurred. I take issue with Dr. Gladden's theory that labor should be induced ahead of term. We do not know the condition of the scar in any case, and in my opinion it is just as likely to give way at eight as at nine months. If rupture should occur, the danger of peritonitis is certainly greater if a foreign body has been introduced into the uterus than if the patient has been allowed to fall into labor normally. Of course, induction by the modified Watson method is perfectly safe, but I should certainly hesitate to do a mechanical induction. The best work on the uterine scar after section of which I have knowledge has been done by Otto Schwarz of Washington University at Barnes Hospital. He makes the point that there is no true muscle regeneration present, and that the fibrous thickness is dependent upon the type of healing and whether or not infection is present. This we cannot decide upon, but I would emphasize the point that we are gambling somewhat when we risk natural delivery after cesarean section, although, as Dr. Gladden says, the chances are in our favor in view of the notoriously poor results of cesarean section in the average hands.

DR. HILLIARD E. MILLER.—I have had the good fortune to take some five of these cases through a second labor, where the original cesarean had been done for conditions other than contraction, and I have had no rupture or threatened rupture in any of them. In all of them, however, as Dr. Levy has emphasized, as soon as the cervix was fully dilated and the head far enough down to make delivery possible, the patient was relieved of the strain of the second stage by forceps delivery. I believe the danger of rupture is rather greater after the low operation, because the incision is made through the thinned out lower segment of the uterus, which has already been subjected to considerable stretching. Dr. Losee of the New York Lying-In Hospital some time ago made an extensive study of cesarean scars which were removed at subsequent operations, and he found that in practically every instance where the scar was weak, there was definite evidence that it had healed by granulation, or that the endometrium had not been properly closed and seepage of the lochia or clotted blood had occurred. For this reason he lays stress upon the necessity of closing the endometrium also. The old idea, which is contrary to this view, was that if the endometrium were closed, the lochia would infect the stitches as they went through it, but careful studies of cases in which closure of the endometrium was done proves that there is no particular danger from this source. For my own part, I propose in future cases to include the endometrium in my suture line. I might add that in one case in my series, in which I delivered the patient of her second baby by forceps, Dr. Jeff Miller recently delivered her of triplets without instrumental assistance.

DR. E. L. KING.—We are always gambling, as Dr. Levy has said, when we deliver these cases by the natural route. I believe, too, that the incidence of rupture of the scar is more than the 4 or 5 per cent commonly reported. Several years ago Holland collected a series of several thousand cases delivered by cesarean section and made a report thereon in the *British Journal of Obstetrics and Gynecology*. Four hundred and forty-eight of these women were subsequently delivered of second babies, the incidence of rupture being about 4 per cent. In 352 cases, however, delivery was by a second cesarean operation; in other words, there was no chance of rupture, for natural delivery was not attempted. That left only 96 patients who were allowed to go into labor, and as 18 scars ruptured, the incidence is raised to over 18 per cent. You will note how that compares with Dr. Gladden's series of 15 cases with 3 ruptures. I take it that we are really deluding ourselves when we say that the incidence of rupture is from 3 to 5 per cent, but I still believe that the chances are in our favor when we attempt delivery from below. The method of suturing has attracted much attention, and in this article of Holland's to which I refer the statistics seem to show a leaning towards interrupted, buried silkworm sutures to close the uterine wall, reenforced by catgut for the uterine peritoneum. The series of silkworm cases, however, was too small to justify basing any definite conclusions thereon. To my mind the suture material does not make nearly so much difference as the technic. We have to bear in mind always that in these uteri, involution is going on and a wound originally 4 inches, say, at the end of a few days is not more than half as large, so that there is bound to be some slack in our stitches, and the wound may open up and heal secondarily instead of primarily. Dr. Gamble of Johns Hopkins studied histologically a series of 15 uteri removed at operation subsequent to a former cesarean section, and compared the condition of the scar with the temperature chart of the former operation. He found no apparent correlation between the condition of the scar and the former convalescence. Patients with febrile charts showed strong scars, and patients with practically normal temperatures showed weak scars, which seems to prove that reliance on the history of the former convalescence may give us a false sense of security. I believe that we are right in attempting the delivery of selected cases from below, but I also believe that we are running considerable risk of rupture, and if this does occur, the mortality rate will be high. I remember one patient who was delivered of her first baby by cesarean section. In her second labor she was in the operating room on the table, ready for laparotomy, when rupture of the scar occurred, and death ensued before the operation could be completed. I would like to add to Dr. Gladden's series a case which was recently delivered at Touro with excellent results by midforceps. I have information also regarding another case, which is possibly included in Dr. Levy's number. She had her first baby by cesarean section at Charity Hospital many years ago, her second baby by cesarean section at Touro, her third baby was delivered there by Dr. W. E. Levy by midforceps, and her fourth baby has recently been delivered by the natural channel without instrumental assistance of any sort.

DR. GLADDEN (closing).—I did not, of course, intend to try to draw any conclusions from a series of 21 cases, but I did mean to make the point that the old theory that one cesarean means a second cesarean is not necessarily good obstetrics. All of the literature I have consulted on this subject seems to stress approximation of the uterine layers as the most important single factor in guarding against subsequent rupture, and not including the endometrium, as it would weaken the scar. The idea of inducing labor in these cases prematurely is that it is easier to deliver a five pound baby than an eight pound one, and that the strain on the uterine muscle with its possibly weak scar is certainly less. I can see Dr. Levy's point, however, that there is an added danger of infection if rupture does occur and there has been interference.

NEW YORK ACADEMY OF MEDICINE

SECTION ON OBSTETRICS AND GYNECOLOGY

STATED MEETING, HELD OCTOBER 27, 1925

DR. EDWIN W. HOLLADAY IN THE CHAIR

DRS. JOSEPH W. DRAPER AND W. E. STUDDIFORD, JR., presented (by invitation) the report of **A Case of Actinomycosis of the Tubes and Ovaries.** (For original article see page 603.)

DISCUSSION

DR. M. ROBINSON.—About six years ago I reported a case of actinomycosis of both ovaries in a girl of thirteen. The lesions at the time were identical with those presented but this girl had not menstruated as yet. There were no evidences or clues to lead one to suppose that there was any entry *per vaginam* or through the genital tract. The patient lived for about one year after the operation and finally died of the actinomycosis.

DR. ALFRED PLAUT.—In the last two years in the Woman's Hospital I have seen two cases of actinomycosis in the abdominal cavity of women. One patient was a colored woman about twenty-three years of age, who had been complaining of heaviness and pain in the abdomen for about one year. At operation, by Dr. Bryon Goff, adnexal masses were found which were partly hard and partly soft. The operation was exceedingly difficult and required two hours. The uterus seemed to be normal, and in order not to prolong the operation, it was left. Clinically the entire mass gave the suggestion of myoma and adhesions. There was a great quantity of yellow material with a similarity to corpus luteum. Microscopically it was found to be granulation tissue with an enormous number of giant cells, and I found a few actinomycotic granules. I could make the diagnosis in this case only after long study. This yellow tissue was chiefly pseudoxanthomatous in type and had accumulated in such a manner as to suggest a tumor-like growth, but there was no tumor; it was only actinomycosis. The woman is now in perfect health. No abnormality can be felt in the abdomen now, a year and a half after operation. She had a sinus in the first few weeks but this healed. How long she will remain in good health, I really cannot prognosticate.

The second specimen reached me only a few hours ago. The patient was operated upon by Dr. Sturmdorf for an abdominal tumor. A mass the size of a fist, looking very much like a firm large carcinoma of the breast, had been adherent to the cecum. It gave the impression of a so-called pseudosarcoma or inflammatory tumor, but there was no history of an inflammatory condition in the abdomen during the past two years. I was unable to make a diagnosis on the gross specimen, although carcinoma did not seem probable to me. Frozen sections showed only connective tissue and I reported that probably it was one of these cases. When the complete specimen was examined, I saw that it contained pus and necrotic material and that in the center of the necrosis was a granule the size of a poppy-seed. The diagnosis of actinomycosis was confirmed by microscopic examination. Certain small masses, on further examination showed typical plant cells and two small calcified pieces of wood. The calcification present makes it probable that some foreign body penetrated the abdominal wall and perhaps gave rise to the infection.

DRS. HALSTED AND WILENS presented a paper entitled **The Need for A Urologic Department in Every Gynecologic Clinic.** (For original article see page 664.)

DISCUSSION

DR. HENRY D. FURNISS.—I believe that an incidence of 3 per cent of urinary disturbances in gynecologic services is entirely too low and that it will run anywhere from 20 to 30 per cent, if you take into consideration the minor degrees of trouble that these women have. There are three causes of urinary trouble in women: one is essentially in the urinary tract; another is where the urinary symptoms are more or less dependent upon the gynecologic condition, and in the third, the two coexist. I believe we have been inclined to attribute too many of our urologic cases to a gynecologic condition, because while both may be caused by the same factor, they are more or less independent.

The service should be a part of the gynecologic department and the patients should not be referred to the urologist. Where we find such a large number of urologic conditions, I think it behooves every gynecologic service not only to train some men to do the work, but to train every one of the men to do the urologic work.

I was rather impressed with the small number of stone and tuberculous cases.

We find stricture of the ureter a rather frequent condition. I think Hunner deserves a tremendous amount of credit for the work he has done along that line.

Correspondence

On the Effects of Sex Hormones in Determining the Sex Ratio: A Criticism of Kovacs' Paper

BY CARL R. MOORE, PH.D., CHICAGO, ILL.

(From the Hull Zoological Laboratory, University of Chicago)

The October (1925) number of this Journal contained a paper by Francis Kovacs, M.D.,^{3a} entitled "The Influence of the Male Sex Gland on the Female. An Experimental Study to Determine the Sex Ratio of the Offspring." Contributions to this broad and important field of sex biology, if they merit the attention of the scientific worker or the medical practitioner, should present a fair implication of the progress attained in the subject and should be based upon sufficient and adequately studied materials. Phenomenal steps in the progress of development of our knowledge in such a field merit the closest attention. Dr. Kovacs' first point in conclusion is given as follows: "The sex ratio of the offspring of the albino rat can be changed to the advantage of the male by subcutaneous injections with testis tissue." If such a contention has been proved the work must be considered an outstanding contribution to our existing knowledge, but if not well established it should be questioned for the sake of avoiding confusion in future work. Acceptance of unsubstantiated conclusions sometimes influences the trend of development adversely and the known facts shown by sex studies are within themselves so confusing that it is essential to weigh with care the data and conclusions of different workers.

My appreciation is here expressed to the editor for the opportunity to call attention to certain points not clearly established by this author.

Let us examine the premises of Kovacs' thesis.

(a) He injected freshly ground rat testes into six pregnant female rats; obtained six litters numbering 28 males and 21 females, which by conversion is said to represent a sex ratio of 133 males to 100 females. Since the normal ratio is said to be 105 males to 100 females we read, "Comparing this statement with our figures, we find a change in the sex ratio of 27.5 per cent to the advantage of the male in our experiment" (page 531). Now let us suppose that a single additional litter of 8 females and 1 male had been obtained (a not infrequent finding), the numbers would then have been 29 males and 29 females, which converted to 100 would have shown an advantage in the female direction. Since normal litters are many times all males or females, a sex ratio of this character is readily understood to be unconvincing.

(b) Kovacs' second series of five litters (after earlier injections to females) summarized in Table I, page 532, consisted of 16 males and 11 females, with two litters of the five made up of equal numbers of males and females; thus differences in the number of each sex were obtained in but three litters. "Converting these numbers, we obtain the ratio 145.40 males to 100 females and so the changing of the sex ratio from the normal basis to the advantage of the male is 39.9 per cent" (page 534). Such conclusions from differences in three litters is almost as preposterous as concluding that in a normal litter of seven females and one male the hormones of the mother's ovary have modified the sex ratio of her young to the advantage of the female by several hundred per cent.

(c) Kovacs transplanted testes into 10 female rats, caged them with males, and killed all females within seventy-five days after transplantation. He obtained from

the 10 females four litters of 10, 3, 5, and 3 young, of which 15 were males and 6 females—" . . . a sex ratio of 250 males to 100 females" (page 543). Two of the mothers showed no macroscopic or microscopic evidence of testis tissue remaining from the transplantation. Six of the 10 females with testis grafts did not deliver litters between the time of transplantation and autopsy, a period of but seventy-five days during the months of February, March, and April. To explain this result we find the statement " . . . we must conclude that the testis hormones, carried into the female circulation by the functioning transplanted testis tissue, have effected sterility in six cases (60 per cent)," (page 537). In this regard it should be mentioned that a seasonal rest from reproduction usually occurs in the white rat during these months and only under exceptionally controlled laboratory conditions (temperature, food, etc.) can a rat colony be kept in continuous reproduction throughout the year. And finally (page 540), since one of the four littered females failed to build a nest and actually devoured the young, we find the explanation based upon the effect of the testis transplantation carried out a month earlier. Let us remember that without a carefully controlled diet often real epidemics of devouring newborn young occur in normal colonies.

The basic ideas of Kovacs' departure as stated, rests first upon the work of Steinach, wherein sex gland transplantations are shown to have some modifying effect upon the host organism under certain conditions and, second, on the modifying effects of the male hormone on female development when, as in cattle twins, there occurs a fusion of blood vessels and a direct vascular connection between the two embryos. Beyond doubt the critical reader would appreciate direction to such fundamental work and whereas three references are given to the work of Steinach, the only text reference to the cattle twin hormone effects is Keller and Tandler (quot. Term. Tud. Kozl., 1923), which I am afraid is not readily available to American readers. This very fundamental work on the modifying influences of the hormones during development of the embryo was done independently by Keller and Tandler¹⁰, ¹⁷ and F. R. Lillie. But whereas the papers of the former authors are somewhat difficult to obtain, the beautifully illustrated and adequately discussed observations of Lillie¹¹ are readily available to those interested. These detailed observations and discussions were preceded by a preliminary announcement¹⁰ and supplemented by three papers ¹², ¹³, ¹⁴ from this writer, and the work extended in several papers by his students,¹, ², ³, ¹⁵, ¹⁸ In reference No. 20 Kovacs does cite Lillie's main paper on the subject, but the title is not given and the text does not reveal the character of this outstanding contribution.

Lillie has made clear that no modification of the developing female occurs if a direct blood connection is not established between the two individuals, and he believes the evidence good that the placenta is impermeable to sex hormones. This question has neither been proved nor disproved, but Kovacs assumes for his purpose, without considering other conditions that should follow, that the placenta is readily permeable for these unknown substances.

I have attempted since 1917 to obtain information on this important point by (1) testicular injections into pregnant females, (2) by transplantation of testes onto the fetal membranes, (3) by parabiotic union of young, and adult, males and females, hoping to later breed the females, (4) by the injection of other male substances into pregnant females, and (5) by testis transplantation to females with subsequent breeding. None of this extensive work, excepting that dealing with testis grafts, has been published because the results, subjected to a critical examination, were entirely unconvincing that any effect was detectable. Animals (rats and guinea pigs) that had received from three to thirteen injections of heavy testicular suspensions during pregnancy gave birth to normal litters of mixed sexes in proportions that caused no excitement. I have obtained litters from female rats that had carried two testis grafts for months before becoming pregnant and during the preg-

nancy, that contained normal young of both sexes. I did not obtain evidence that testis grafts tended to render the female sterile.

Turning our attention to Kovacs' testis grafts one is unconvinced by any of his six figures that a healthy graft was obtained. Two large testes were placed on the peritoneum of the females, and the latter killed seventy-five days later. Six of the ten cases were rated as *successful grafts* though mention is made that in some cases graft remains could not be detected except by histologic section of the region where the graft was placed. If two large testes are so markedly absorbed within seventy-five days that they are not visible macroscopically, it would be questionable whether active functional tissue was present. His figures strongly indicate that either the testis has been resorbed, excepting a few scattered epithelial tubules (from what portion of the testis is not clear), or that the remaining portion is necrotic and undergoing slow removal. His Fig. 5 shows a large area of testis material, but the majority of it consists of outlines of tubules so completely necrotic that cells or nuclei are not visible; the remainder of the figure consists of tubules very obviously necrotic and labeled "atrophic but functioning canals without spermatogenesis". It is not clear what function necrotic seminiferous tubules are supposed to have since he evidently believes that the interstitial cells are responsible for the hormones. He claims interstitial cell hypertrophy but his figures do not convince one that such has occurred.

In discussing the earlier contentions of Steinach that testes cannot be successfully transplanted into normal females, the following sentence is found: "Our experimental study neglecting Steinach's principal biologic thesis, seemed the more hopeless, because we were not able to find any literature refuting this dogma" (page 541). It is not surprising amid the vast literature on sex problems that papers are often not seen, but in this connection I will call attention to some remarks of my own. In "Science", 1920,⁴ I presented evidence that both the hypotheses of Steinach and Sand were untenable. In the next year⁵ more details were published. This controversy was again emphasized by me in 1923⁶, and in 1924.^{7, 8} A more extensive presentation of the testis graft problem will appear some time in 1926.⁹

Taking into consideration the variability of sex in given litters of the normal rat, it would appear quite convincing that evidence of a more substantial nature than presented by Kovacs is necessary to establish as a fact the possibility of so easily influencing sexual development of the unborn young of mammals.

REFERENCES

- ¹Bascom, K. F.: Am. Jour. Anat., 1923, xxxi, 223-259.
- ²Bissonnette, T. H.: Am. Jour. Anat., 1924, xxxiii, 267-346.
- ³Chapin, C. L.: Jour. Exper. Zool., 1917, xxiii, 453-482.
- ^{3a}Kovacs, F.: AM. JOUR. OBST. AND GYNEC., 1925, x, 527-544.
- ⁴Moore, Carl R.: Science, 1920, lii, 179-182.
- ⁵—: Jour. Exper. Zool., 1921, xxxiii, 129-171.
- ⁶—: Proc. Assn. Anat., Anat. Rec., 1923, xxv, 142.
- ⁷—: Science, 1924, lix, 41-44.
- ⁸—: Endocrinology, 1924, viii, 493-508.
- ⁹—: Am. Jour. Anat., 1926, Vol. (in press).
- ¹⁰Lillie, F. R.: Science, 1916, xliii, 611-613.
- ¹¹—: Jour. Exper. Zool., 1917, xxiii, 371-452.
- ¹²—: Proc. Nat. Acad. Sci., 1917, iii, 464-470.
- ¹³—: Science, 1919, l, 183-184.
- ¹⁴—: Biol. Bull., 1923, xlv, 47-78.
- ¹⁵Lillie, F. R., and Bascom, K. F.: Science, 1922, lv, 624-625.
- ¹⁶Tandler, J., and Keller K.: Deutsche tierärztl. Wehnschr., Jahrig., 1911, xix (cited by Lillie).
- ¹⁷—: Wien. tierärztl. Wehnschr., Jahrgang, 1916, No. 12 (cited by Lillie).
- ¹⁸Willier, B. H.: Jour. Exper. Zool., 1920, xxxiii, 63-127.

Reply to Dr. Moore's Criticism Concerning My Paper on "The Influence of the Male Sex Gland on the Female, Etc."

I want to thank Dr. Moore for his kind attention to my article as indicated by his criticism. Discussion is the only way to avoid misunderstandings in scientific problems.

Moore objects to the small number of my experimental animals. But I emphasized in my paper that "the value of these results is diminished by the smallness of the numbers" and that "this fault of the article is due to limited means and time." I had to start my experimental work under foreign conditions in November, 1924, and I had to complete it, because of leaving Baltimore, in May, 1925. Thus I have to repeat the words of my article to which Moore gave but little attention: "The above experiments are only the outlines of further research work The working out of this problem with a much larger number of animals on a broader basis is the task of further investigations" (p. 543).

On the other hand, it cannot be denied that it would seem improbable that such a constant increasing change of the sex ratio to the advantage of the male, through all the three series of my experiments, is due to mere chance. Moore analyzes the results in single series. But if we summarize the results of all the three experimental series, we get 21 treated females with 15 litters, consisting of 59 males and 38 females. Converting these figures, we obtain the ratio of 155.3 males to 100 females. These numbers are not so insignificant.

Moore doubts that the testis transplantation caused sterility. But the seasonal rest from reproduction mentioned by him did not occur in the control animals kept under the same laboratory conditions. Besides that, we observed—in accordance with the findings of many other authors,—the production of temporary sterility caused by subcutaneous injections of testis gland (p. 533). There is no difficulty in supposing that the transplanted male sex gland has the same effect as the injections with testis tissue.

Moore erroneously considers that I assert or assume that the placenta is readily permeable for sex hormones. I did not express such an opinion. This unsolved problem is completely indifferent concerning my experiments, as the development of the sex character probably occurs much earlier than the first appearance of the placenta. I believed that the testis hormones carried into the females might perhaps influence the egg "in the earliest stage of its development, in the first differentiation, perhaps even in the stage of the maturation division of the ovum, before its fertilization" (p. 530).

Concerning the results of the transplantation, I am sorry that Moore does not find convincing the photographs which I published. If the histologic sections of the grafts show living gland tissue, it cannot be questioned whether active functional tissue is present: and the pictures of these sections leave us no cause for doubt in this respect (Figs. 1, 2, 3, 4, and 5). Figure 6a indicates a very striking picture of interstitial cell hypertrophy. Whether or not these grafts would have been resorbed later if we had not killed the rats, has no bearing on the influence of the grafts on the developing eggs. This influence occurred while the transplant was still in full bloom.

With regret I acknowledge that I overlooked Moore's papers dealing with this subject and I am glad to learn that he also confirmed my statements concerning Steinach's hypothesis about the gonads-antagonism.

FRANCIS KOVÁCS, M.D.

SECOND GYNECOLOGICAL CLINIC,
UNIVERSITY OF BUDAPEST.

The Conservative Treatment of Eclampsia

TO THE EDITOR.

I am indebted to Dr. Solomons for his letter to the editor of the *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY* (in the December 1925 issue) calling attention to an error which I made in quoting the statistics of the Rotunda Hospital in my paper on "The Conservative Treatment of Eclampsia," which appeared in the March, 1925, issue of that journal. I had read Dr. Solomons' paper in the Autumn, 1922, number of the *Journal of Obstetrics and Gynaecology of the British Empire*, as well as the one by Dr. Gibbon Fitzgibbon in the same issue of this journal, and in writing my paper I erroneously ascribed the collective statistics quoted (204 cases with 10.29 per cent maternal mortality) to Dr. Fitzgibbon. I was aware of the fact that Dr. Fitzgibbon had discontinued using morphine shortly after becoming Master, as stated by him in his paper, and that before this, the eclamptic patients under treatment at the Rotunda Hospital had received morphine. I intended to bring out these points, but I expressed myself poorly, and apparently claimed that morphine had not been employed at all in the treatment of these 204 cases. This was not my intention, but on rereading my article I can see that this is the most plausible construction to be placed on the sentence quoted. I wish to correct this misconception, and am therefore requesting the editor of the *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY* to publish this letter.

E. L. KING, M.D.

Books Received

THE MEDICAL DEPARTMENT OF THE UNITED STATES IN THE WORLD WAR. Vol. viii. Field Operations. Washington, D. C. Government Printing Office, 1925.

INTERNATIONAL CLINICS. A quarterly of illustrated clinical lectures and especially prepared articles. Vol I, Thirty-sixth Series. Philadelphia, J. B. Lippincott Company, 1926.

RECENT ADVANCES IN OBSTETRICS AND GYNAECOLOGY. By Aleck W. Bourne, obstetric surgeon to out-patients, St. Mary's Hospital, etc. With 58 illustrations. Philadelphia, P. Blakiston's Son & Co., 1926.

NEPHRITIS. By Herman Elwyn, assistant physician, Gouverneur Hospital, New York. New York, The Macmillan Company, 1926.

TEXTBOOK OF OBSTETRICS. By Thomas Watts Eden, consulting obstetrician to Charing Cross Hospital, and Eardley Holland, obstetric and gynaecologic surgeon to the London Hospital. Sixth edition, with 7 plates and 393 illustrations in the text. New York, Macmillan Company, 1925.

LE TRAITEMENT DE LA SYPHILIS PAR LE BISMUTH. Par le Dr. Georges Drouet. Paris, A. Maloine et Fils, editeurs, 1926.

BIOLOGIE UND PATHOLOGIE DES WEIBES. Herausgegeben von Professor Halban, und Professor Seitz. Lieferungen 21 & 22. Wien, Urban & Schwarzenberg, 1926.

THE X-RAY IN EMBRYOLOGY AND OBSTETRICS. By W. A. Newman Dorland, A.M., M.D., Professor of Gynecology and Obstetrics and head of the Department of Obstetrics in the Postgraduate School of Medicine of Chicago, and Maximilian John Hubeny, M.D. St. Paul, Minn., Bruce Publishing Co., 1926.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

The Obstetric Literature of 1925

BY J. P. GREENHILL, B.S., M.D., CHICAGO

THE year 1925 marks but little progress in obstetrics. We have learned more about the functions of the graafian follicle, corpus luteum, and placenta, and more about the reaction of the uterine endometrium in cases of tubal pregnancy. No new light has been shed on the etiology of the toxemias of pregnancy, and although many laborious studies have been made on the blood chemistry in eclampsia, very little practical use can as yet be made of the results. The treatment of hyperemesis gravidarum is fairly uniform but not that of eclampsia. Obstetricians are still divided into those who treat eclampsia conservatively and those who favor active therapy. The tendency, however, is definitely toward conservatism. Magnesium sulphate and insulin are now being used in the treatment of eclampsia and the reports are very encouraging. In the treatment of pyelitis of pregnancy ureteral catheterization is the favorite remedy. Gwathmey's method of analgesia is being praised highly by nearly all who use it. An attempt is being made to foster the use of more local anesthesia in obstetrics, especially for cesarean section. The low or cervical cesarean section is gaining new disciples very rapidly, and abdominal delivery is becoming more popular for placenta previa. The subject of postpartum hemorrhage was thoroughly prepared for the German Gynecological Congress from an analysis of almost one million labor cases. Puerperal sepsis is being treated more conservatively and intravenous medication for this condition is unequivocally condemned. A number of timely papers have appeared on the subject of maternal welfare and the teaching of obstetrics. Lastly, hospitals and cities are analyzing their results, presenting them to the profession and seeking means of improvement.

PREGNANCY

Physiology.—The physiology and chemistry of the female sex hormone are discussed by Frank and Gustavson,¹ who point out that the endocrine factors producing the changes of the sex cycle are successively supplied by the graafian follicle, the corpus luteum, and the placenta. To emphasize this continuity, the authors propose the name gestational gland for the triad. A somewhat similar paper is that of Allen, Pratt and Doisy,² who discuss the distribution of the ovarian follicular hormone in the human genital tissues. In a later paper, Frank, Gustavson and Kingery³ describe experiments which indicate that puberty results from an elaboration of the female sex hormone,

and is not due to the removal of an inhibitory influence from glands of internal secretion like the thymus or the pineal.

To affirm the question, "Does true menstruation occur after the beginning of pregnancy?" Wintz⁴ emphasizes that to prove menstruation one must find pieces of uterine endometrium in the blood which is passed during pregnancy, and that in addition to the corpus luteum of pregnancy, there must be another corpus luteum in a stage of development which corresponds with the menstrual bleeding. Finally the bleeding must coincide with the regular menstrual cycle. The author could find in the literature only ten authentic cases of menstruation during pregnancy, and to this number he adds three cases of his own. In some instances of menstruation during pregnancy the patient has a double uterus. The reviewer has at the present time under his care a patient who has a double uterus, cervix, and vagina. She has a pregnancy in the right uterus. A few months ago a physician curetted the patient because she bled during pregnancy and to his surprise obtained a normal ovum. He did not suspect that the patient had a double uterus and that the bleeding might have been the result of a menstrual change in the nonpregnant uterus. Most likely, therefore, in this patient, pregnancy did not inhibit ovulation.

Schilling⁵ reports a case of pregnancy with intact hymen. Such an occurrence is fairly uncommon. Kisch⁶ reported 25 such cases which occurred between 1672 and 1885. Recently cases of this kind have been reported by Gál,⁷ Flechtenmacher,⁸ Van Tongeren,⁹ and Bischoff.¹⁰

From interesting experiments performed by Sun¹¹ the conclusion is reached that the human uterus contracts rhythmically throughout life. Keiffer¹² found that the round ligament possesses exactly the same histologic structure and the same power of contraction as the uterus; hence the round ligament is the material of choice with which to conduct experiments on uterine mobility.

Kennedy¹³ believes that isthmospasm of the fallopian tubes represents one type of obstruction preventing the meeting of the ovum and the spermatozoa and may be the only obstruction interfering with the passage of a fertilized ovum from the tube into the uterus, thus being a predisposing factor in ectopic gestation. A study of the intramural portion of normal and diseased tubes led Geist and Goldberger¹⁴ to conclude that the course of the intramural portion may offer a bar to impregnation, a conclusion similar to that reached by Daniel.¹⁵ Intramural lesions may be present with or without closure of the fimbriated end and may give a positive or negative insufflation test in normal tubes.

From a study of 109 patients Moench¹⁶ concludes that carbon dioxide insufflation of the fallopian tubes is a valuable and safe test when properly carried out. However, morbidities and mortalities have occurred; hence the test should be used only when indicated. Laurentie and Moussali¹⁷ report a case of extrauterine pregnancy which immediately followed a tubal patency test. Ott¹⁸ considers the injection of air into the tubes a dangerous procedure and advises injection of charcoal into the peritoneal cavity instead. If the tubes are open the charcoal may be seen in the vagina in from ten to twelve minutes.

Fellner¹⁹ claims to have discovered a peculiar phenomenon which occurs in early pregnancy; namely, a diminution in size of the uterus during the course of examination. This phenomenon, however, is not surprising and is probably nothing more than a contraction of the uterus (Braxton-Hicks) induced mechanically by the examining fingers.

The question of the possibility of superfetation crops up periodically. Maury²⁰ recently reported a probable case, and he emphasizes that to be beyond suspicion a case of superfetation should present two living fetuses of different ages, and two corpora lutea in different stages of development, corresponding to the ages of the fetuses. The author reports a case where there were two fetuses, one intra- and the other extrauterine, in different stages of development and two corpora lutea showing marked differences. Jardin²¹ claims to have proved the occurrence of superfetation by radiography. In the case he reports, x-ray showed ossification centers in the femurs of one fetus but not in the other; hence he concludes that there was a difference in development of six to eight weeks. In the discussion of this paper, Cathala²² reported a case of twins which had dissimilar ossification centers but he ruled out superfetation because histologic examination of the placentas showed them to be of the same age. In some cases of uniovular twins, where there is no doubt that both fetuses are of the same age, ossification may not be equally developed.

A new method of determining the area of the pelvic inlet by x-ray pelvimetry is described by Thoms.²³ Another procedure for the same purpose is reported by Archangelsky,²⁴ who takes into consideration as well the size of the fetal head. Stereoscopic x-ray plates give much more information regarding the cephalopelvic relationship than single plates.

The question of bitemporal hemianopsia in pregnancy is discussed again this year, but the evidence of Schall²⁵ and of Metzger, Simon, and Weinberg²⁶ points against the idea of a diminution of the fields of vision in pregnancy.

Abortion and Extrauterine Pregnancy.—From a study of 1434 cases of abortion, Gerstmann²⁷ believes the best plan of treating febrile abortions is the following: If there are no symptoms of parametritis or perimetritis, salpingitis, pyemia or sepsis, and the general condition is good, the uterus should be emptied regardless of whether the temperature is normal or 104° F. In all other cases conservative therapy is employed. Tuttle²⁸ believes that those cases should be treated conservatively where the infection has extended beyond the uterus and where there is no evidence of retained secundines. However, if such tissue is retained in the uterus it should be removed, provided the removal can be accomplished without spreading the infection. But how can one foretell whether or not he will spread the infection? At the Chicago Lying-In Hospital septic abortion is treated in a most conservative manner with excellent results.

The possible influence of infection on the intrauterine death of the child has been suggested, notably by DeLee, and by Curtis. The latter²⁹ recently studied this question anew and concluded that focal infection with a tendency to fresh exacerbations appears to be an important cause of otherwise inexplicable spontaneous abortions.

Novak and Darner³⁰ made a very thorough study of 21 cases of tubal pregnancy in which in addition to the tubal gestation sac, the uterine mucosa was available for study, thus affording an opportunity of correlating the uterine and tubal changes in this connection. The decidua reaction occurring in the uterus with extrauterine pregnancy was found to be identical with that of normal gestation as long as the embryo was alive. With the death of the latter, however, the superficial compact portion is cast off. The external vaginal bleeding is of endo-

metrial origin and is initiated by separation of the placenta. Decidual reaction in the tubal wall occurs at least in a fraction of the cases.

The value of the leucocyte count as an aid to the diagnosis of ectopic gestation is pointed out by Farrar.³¹ She shows that the leucocyte count is an index to the amount of free blood in the peritoneal cavity and the polymorphonuclear leucocyte count increases markedly only in cases having fresh blood in the pelvis.

Hammerschlag³² believes that transfused blood is functionless since there is no marked increase either in the hemoglobin content or the red cell count. He believes that blood transfusion is practically never necessary in extrauterine pregnancy. This belief is contrary to the experience of most of us who have seen definite improvement after blood transfusion in many cases, including those of ectopic pregnancy.

Complications.—During the last four years in the medical clinic of the Chicago Lying-In Hospital, Daly and Strouse³³ observed a considerable number of women who presented such symptoms and physical findings as insomnia, headache, palpitation, tachycardia and increased blood pressure. The syndrome indicated an increased activity of the thyroid due to excessive demands which diminished the iodine store to the point at which hyperplasia and increased activity resulted. The usual methods of treatment for increased nervousness were of no avail, therefore a compound solution of iodine, from 3 to 5 drops three times a day for a week at a time, was administered to the patients with gratifying results.

Couput³⁴ reports a case of complete cicatricial obliteration of the vagina during pregnancy. Greenhill³⁵ reports a case of atresia of the vagina which was present before pregnancy. Upon the demand of the patient, a plastic operation was performed during pregnancy to permit coitus, but atresia again resulted after delivery from below. A second and more extensive plastic operation was performed with good results a few months after delivery. Of 303 cases of stenosis of the vagina reported in the literature, 245 had vaginal deliveries. In most of the latter there was a return of the stenosis. In many cases injuries and fistulae resulted. The mortality for the 245 patients delivered *per vias naturales* was 10.55 per cent, which is indeed appalling. Cesarean section is the best method of delivery in most of these cases.

In a study of glycosuria during pregnancy, Crook³⁶ found that the urine of about 30 per cent of pregnant women contained sugar at some time during pregnancy. J. T. Williams,³⁷ however, found the incidence to be 13.6 per cent. Both of these figures are high for the ordinary sugar tests.

Wagner³⁸ emphasizes that cardiac disease is a serious condition in pregnancy and labor. In cases of heart trouble he found a mortality of 14 per cent, and he believes the causes of the cardiac disturbance are: first, the increased work necessitated by pregnancy, and secondly, the increased volume of output. In taking care of a pregnant woman, who has heart disease, the wise and careful obstetrician will call in consultation a heart specialist, because cardiac disease is a treacherous complication.

A very thorough review of the recent literature on the subject of cancer and pregnancy is presented by Vignes and Duhail.³⁹ These authors found that while in some cases cancer during pregnancy is arrested temporarily or even retrogresses, it usually progresses just as it does

in nonpregnant individuals. Cancer of organs near the uterus, such as the rectum, and of those organs connected with the uterus "humorally," like the breast and thyroid, is more affected by pregnancy than cancer elsewhere. The effect of pregnancy on cancer is usually a bad one. On the other hand, cancer frequently affects pregnancy. Often a miscarriage occurs and at term many babies die because of dystocia produced by cancer of the birth canal or rectum.

Zangemeister and Baer⁴⁰ report a series of 96 cases in which they induced labor for contracted pelvis by means of a bag. Six babies and one mother died. In this country very few obstetricians induce labor for contracted pelvis.

The association of syphilis and pregnancy is discussed in a number of articles. Nathanson⁴¹ believes that a positive Wassermann reaction during pregnancy constitutes very decisive evidence of the existence of syphilis in the mother. Belding,⁴² on the other hand, believes that the unreliability of the Wassermann reaction and the lack of clinical evidence renders the recognition of syphilis in the pregnant woman especially difficult. Data on the results obtained by treating women during the childbearing period collected from 18 municipal clinics of the state of New York are offered by Lawrence.⁴³ The experience of these clinics indicates that any community can reduce materially the number of infant deaths and increase its birth rate by maintaining properly organized prenatal and venereal clinics.

The question of syphilis in pregnancy is a very important one, but authorities differ on what constitutes syphilis. All are agreed that if a patient has signs and symptoms of syphilis she should be treated; but there is no unanimity of opinion concerning the value of the Wassermann reaction during pregnancy. Most of the leading obstetricians feel that a positive Wassermann reaction always means syphilis, and they treat their patients accordingly. A few maintain that a positive Wassermann test during pregnancy does not necessarily mean syphilis. Last year Belding and Hunter⁴⁴ proved the variability of the Wassermann test in pregnancy.

Hydatid mole, while not a common occurrence, is by no means rare. Essen-Möller,⁴⁵ who has seen 50 cases and has followed these cases for many years, found that eight patients subsequently developed a chorioepithelioma or a destructive mole. All attempts to prognosticate the future of patients, who have hydatid mole, by means of histologic study or by the time of onset of hemorrhage have failed. One point, however, is very important and that is the age of the patient. Of Essen-Möller's 50 patients, 22 were over forty years of age, and 18 were above forty-five years. Still more significant is the fact that the risk of malignancy was more than twice as great for the women who had hydatid mole after their forty-fifth year. Because of this, Essen-Möller has done supravaginal hysterectomies on four patients who had hydatid mole, simply because they were over forty-five years of age. Turenne⁴⁶ says the capital indication for hysterectomy in the presence of hydatid mole is uncontrollable hemorrhage. Hysterectomy is also indicated when excessive thinning of the uterus makes curettage dangerous, when cervical dilatation is difficult, and when the uterus remains large and bloody after expulsion of the mole.

Essen-Möller's figure (16 per cent) for the incidence of chorioepithelioma following hydatid mole is very much higher than the incidence found in large series of cases. Most authors believe the inci-

dence is only about 1 per cent. On the other hand, in about one-half the cases of chorioepithelioma there is an antecedent occurrence of hydatid mole. In view of the fairly good prognosis in hydatid mole, hysterectomy is a most radical form of treatment, especially in a primipara.

The Toxemias.—Many papers were written this year on the toxemias of pregnancy both early and late, but not much light has been shed on the subject. Titus⁴⁷ reports very favorable results in 328 cases of hyperemesis gravidarum treated by high carbohydrate feeding or intravenous injections of glucose. The basis for this treatment is the physiologic assumption that there is a carbohydrate deficiency in the maternal organism. Thalhimer⁴⁸ combines insulin with the intravenous administration of glucose. Titus, however, believes that there is not only no clinical advantage in adding the insulin but also the possibility of distinct harm from the simultaneous use of insulin. This is due to the fact that insulin causes glycogen stores to be diminished by its demand for glucose to be oxidized.

While most cases of pernicious vomiting are cured by the administration of glucose intravenously with or without the addition of insulin, quicker results can be obtained by including the duodenal tube in the treatment. Through the tube one may give fluids, carbohydrates, fat, proteins, sedatives, fruit juices and laxatives. The psychogenic factor in hyperemesis must always be borne in mind. Focal infections are sometimes responsible for pernicious vomiting just as they may cause the toxemias late in pregnancy—a point emphasized by DeLee and Talbot.

Cabanes⁴⁹ reports good results in two cases of pernicious vomiting which he treated by subcutaneous injection of 500 c.c. of oxygen. This form of treatment is surely unwarranted and the good results obtained were most likely due to the psychic effect of the injection.

Pyelitis in pregnancy has been the subject of a number of papers. Rush⁵⁰ reports a small series of cases treated with a retention (indwelling) ureteral catheter. He believes that because pyelitis and pyelonephritis are pus conditions they will respond to drainage as do pus conditions in other parts of the body. McClelland⁵¹ also treated a series of patients who had pyelitis in pregnancy by means of the ureteral catheter. He found that patients treated by drainage and sterile water did just as well as those treated by drainage and local antiseptics. Hunner⁵² has seen 35 cases of pyelitis of pregnancy and in all cases but one, ureteral strictures were present. Pyelograms taken at intervals after pregnancy refute the tradition that ureters which are dilated during an attack of pyelitis in pregnancy, return to normal after delivery. In a series of 12 cases of acute pyelitis, Kretschmer and Heaney⁵³ found marked dilatation of both ureters and kidney pelves in 7 cases. The authors believe that during pregnancy dilated ureters and kidney pelves often provoke pains in the sides and upper abdomen. The urinary tract is not suspected since the patient is free from fever and has no pus in the urine. In 19 cases of normal pregnancy, dilatation of the upper urinary tract was found in approximately 80 per cent. A study of the pyelographic findings in pyelitis complicating pregnancy led J. T. Williams⁵⁴ to believe that most cases of pyelitis during pregnancy are not due directly to pregnancy but to a chronic preexisting condition brought to a state of acute activity by the pregnancy, and not to be dismissed after the pregnancy is terminated.

The results of chemical studies on the toxemias of pregnancy are reported by Stander, Duncan and Sisson⁵⁵ and in eclampsia they found the following marked variations from the normal: (1) an elevation in the uric acid of the blood, (2) a decrease in the CO₂ combining power which is in proportion to the intensity of coma, (3) an elevated blood sugar, and (4) an increase in the ratio P:Ca, which is due to a high inorganic phosphorus value. According to Heesch⁵⁶ the termination of the rest nitrogen or urea in the blood is an important aid in differentiation between eclampsia and true uremia. Determinations of uric acid, amino acids, and creatinine are not satisfactory. Frey⁵⁷ believes the following is specific for eclampsia: (1) the amino acids of the blood are at least double the normal figure, so that the ratio of amino acids to rest nitrogen, the eclampsia quotient is greater than 1.75; (2) in all cases which result in eclampsia, the oral ingestion of 20 grams of glucose prolongs the blood-sugar curve beyond 165 minutes. Frey believes these two findings enable one to foretell eclampsia and indicate immediate delivery by cesarean section if medical and dietetic measures have failed. In a valuable book de Wesselow and Wyatt⁵⁸ attempt to differentiate between nephritis and preeclamptic toxemia, but the evidence is unconvincing.

In spite of the immense amount of work done, blood chemistry studies have not proved to be of great practical use. Plass⁵⁹ demonstrated this clearly last year, and the situation has not changed. In the clinical management, most information is obtained from the older methods of examination, urinalysis, blood pressure readings, and ophthalmoscopy.

Since Dienst first propounded the theory that incompatibility between maternal and fetal blood is the cause of eclampsia, many papers have appeared on the subject. In 1923, McQuarrie,⁶⁰ Grubitz,⁶¹ and Ottenberg⁶² wrote in favor of this theory, even though Dienst himself had repudiated it. In 1924, Zotterman and Wildner⁶³ published their studies which failed to support Dienst's theory. This year Cathala and Le Rasle⁶⁴ studied the question, and they also came to the conclusion that incompatibility of the fetal and maternal blood is not responsible for eclampsia or other complications in pregnancy, because in the majority of toxemic patients there is no agglutination. The same conclusion was reached by Ohnesorge.⁶⁵

The treatment of toxemia is discussed by many authors. Most of them emphasize the value of proper prenatal care (Cary,⁶⁶ Greenhill,⁶⁷) but the treatment of the various forms of toxemia, especially eclampsia, is by no means uniform. Poten⁶⁸ obtained the best results in eclampsia by emptying the uterus as soon as possible after the beginning of convulsions. He advocates a rather peculiar form of treatment for postpartum eclampsia, which consists in making a small incision above the umbilicus and fixing the uterus to this point. The basis for this theory is the belief that eclampsia is due to pressure of the uterus on the ureters. This theory harks back to Halbertsma⁶⁹ who in 1888 expressed a similar belief because he found the ureters dilated in a number of eclamptic patients. But as mentioned above, dilatation of the ureters is found in the majority of women during normal pregnancy. The notion that the pregnant uterus presses on the ureters is untenable because the specific gravity of the uterus is no greater than that of the intestines and is certainly less than that

of large fibroids and some ovarian cysts which are movable in the lower abdomen; yet the latter seldom interfere with ureteral activity.

Klaften⁷⁰ believes that great depth of respiration is an early symptom of eclampsia. Wieloch⁷¹ maintains that eclampsia always arises from a previous hydrops gravidarum, and that as edema progresses to preeclampsia, there is an increase in water retention which parallels the increase in severity of the disease. Increase in blood pressure is of extrarenal origin and, according to Zangemeister, is due to stimulation of the vasomotor system through increased cerebral pressure. The latter in turn is due to edema of the brain. The hypertension in the presence of increased intracranial pressure is a protective mechanism to maintain the circulation in the brain. A constant high blood pressure does not cause convulsions. It is only when there is an extra increase that convulsions occur. By injecting collodial substances, such as gelatine, to treat the injured capillaries (representing the cause of the edema), Wieloch caused a decrease in blood pressure in two-thirds of the cases. Venesection is contraindicated when there are symptoms of edema of the brain, because the high blood pressure must be maintained.

Bublitschenko⁷² emphasizes the constitutional peculiarities of patients who develop eclampsia and claims that the disease is not dependent on renal disease. Mussey,⁷³ on the other hand, from a study of 11 cases of eclamptic toxemia, believes that the symptom-complex of preeclamptic toxemia is often identical, in clinical symptomatology and renal function, with that of acute glomerulonephritis.

Hochenbichler⁷⁴ is of the opinion that treatment of toxemic patients with ultraviolet light gives the same results as venesection, causing diminished blood pressure, diuresis, hydremia, and lower temperature. Seitz⁷⁵ advises cesarean section as soon as the subjective symptoms of eclampsia appear (headache, visual disturbances, pain in the epigastrium, etc.).

Wilson⁷⁶ analyzed the results of 247 cases of eclampsia treated at the Johns Hopkins Hospital and found that conservative therapy gave the best results. While conservative treatment did not improve the chances of the child it also did not diminish the chances materially. The fetal mortality in the cesarean section cases was 40 per cent. This is unusually high, as evidenced by the fact that among 17 babies delivered by cesarean section at the Chicago Lying-In Hospital, there were only 3 deaths (17.6 per cent); however, one of these babies was dead on admission and the other two were not viable.

The Stroganoff method of treating eclampsia is discussed by Stander.⁷⁷ While agreeing with most of Stroganoff's ideas, Stander considers two steps irrational, namely, the use of chloroform, and the restriction of venesection to not more than 400 c.c. Schlossmann⁷⁸ studied the blood pressure of 12 eclamptic patients in whom venesection had been performed and found the lowering of the blood pressure to be proportional to the total amount of blood lost in delivery and also that removed by venesection. This is due to the removal of toxins. He says a large amount of blood may be withdrawn without harm as long as the blood pressure remains high. It may not be amiss to emphasize that too much blood should not be withdrawn before delivery, because one cannot tell how much blood a patient will lose during labor, even though the blood of most eclamptic patients does not flow freely.

The intravenous use of magnesium sulphate in the treatment of eclampsia is extolled by Lazard⁷⁹ and the intraspinal by Alton and Lincoln.⁸⁰ The former reports 20 cases with two deaths, while the latter authors claim satisfactory results in 4 cases, although two of the patients died. According to Stander and Duncan,⁸¹ insulin is being used at the Johns Hopkins Hospital for eclampsia where there is coma or semiconsciousness following a convulsion, together with a CO₂ combining power of 30 or lower and an elevated blood sugar. In the few cases treated with insulin the results were excellent.

Döderlein, Jr.,⁸² studied the late results of 26 eclamptic patients and found that 16 were perfectly normal. Three had slight albuminuria, while 7 had evidence of chronic nephrosis. Not one had chronic nephritis.

The trend of most authors is to advocate conservatism in the treatment of eclampsia. Even a few who previously emptied the uterus in most cases of eclampsia, have given this up. However, the number of authorities who perform cesarean section for eclampsia is by no means small. Both forms of therapy give good results, depending upon the severity of the disease and the skill and surroundings of the obstetrician. There is no doubt that for the general practitioner conservatism is the proper course; but in a maternity hospital, excellent results may be obtained by an obstetrician who empties the uterus immediately after the beginning of convulsions.

The matter of statistics of eclampsia is important. First of all there is a difference of opinion as to what constitutes eclampsia. DeLee⁸³ says, "At present we group all cases of convulsions and coma occurring in pregnant women, not due to extraneous medical causes, as hysteria, epilepsy, tumor of the brain, etc., under the term eclampsia. Those rare cases where the woman has all the symptoms of eclampsia without convulsions we call eclampsia just the same." Williams⁸⁴ says, "Eclampsia is an acute toxemia occurring in the pregnant, parturient, or puerperal woman and is usually accompanied by clonic and tonic convulsions, during which there is loss of consciousness, followed by more or less prolonged coma and frequently results in death. Generally convulsions and eclampsia are considered as synonymous terms; but such a view is not correct inasmuch as a number of well authenticated cases of eclampsia without convulsions are reported, and moreover other toxemic conditions occasionally occur in obstetric practice which are likewise accompanied by convulsions or coma. Accordingly the only absolute characteristic feature of this disease is the presence of the hepatic lesions which will be described later."

The last sentence is significant because it means that an autopsy is necessary to make a diagnosis of eclampsia in cases without convulsions and in some doubtful cases with convulsions. There are occasional cases which clinically seem to be eclampsia and yet are not eclampsia. For example, Zangemeister⁸⁵ reports two cases of what appeared to be eclampsia clinically but which autopsy revealed to be sinus thrombosis. There is no record in the literature where, in an eclamptic patient, a sinus thrombosis was found at necropsy, hence Zangemeister's cases were most likely not cases of eclampsia.

Since there is some uncertainty in obtaining statistics concerning eclampsia, might it not be advisable to have a uniform definition of this disease? The reviewer considers as eclampsia all cases showing the typical signs and symptoms of acute toxemia including convul-

sions during pregnancy, labor or the puerperium, where medical causes like epilepsy, etc., can be ruled out, and also those cases of acute toxemia without convulsions which at autopsy show the changes characteristic of eclampsia. If a case of clinical eclampsia with convulsions comes to necropsy and fails to show the hepatic changes characteristic of eclampsia, this case is not to be considered eclampsia.

REFERENCES

- (1) Jour. Am. Med. Assn., 1925, lxxxiv, 1715. (2) Jour. Am. Med. Assn., 1925, lxxxv, 399. (3) Jour. Am. Med. Assn., 1925, lxxxv, 1558. (4) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 303. (5) AM. JOUR. OBST. AND GYNEC., 1925, ix, 258. (6) Quoted by Bischoff, Zentralbl. f. Gynäk., 1925, xlix, 1634. (7) Zentralbl. f. Gynäk., 1924, xlviii, 338. (8) Zentralbl. f. Gynäk., 1924, xlviii, 2546. (9) Zentralbl. f. Gynäk., 1925, xlix, 478. (10) Zentralbl. f. Gynäk., 1925, xlix, 1034. (11) Bull. Johns Hopkins Hosp., 1925, xxxvi, 280. (12) Gynec. et Obstét., 1925, xi, 265. (13) Jour. Am. Med. Assn., 1925, lxxxv, 13. (14) Surg., Gynec. and Obst., 1925, xli, 646. (15) Bull. de la Soc. d'Obstét. et de Gynec., 1925, xii, 387. (16) Jour. Am. Med. Assn., 1925, lxxxiv, 1802. (17) Bull. Soc. d'obst. et de gynéc., de Par., 1925, xiv, 493. (18) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxxi, 58. (19) Zentralbl. f. Gynäk., 1925, xlix, 869. (20) Surg., Gynec. and Obst., 1925, xl, 642. (21) Bull. Soc. d'obst. et de Gynéc. de Par., 1925, xiv, 444. (22) Bull. Soc. d'obst. et de Gynéc. de Par., 1925, xiv, 447. (23) AM. JOUR. OBST. AND GYNEC., 1925, ix, 667, and Jour. Am. Med. Assn., 1925, lxxxv, 253. (24) Arch. f. Gynäk., 1925, cxxiv, 606. (25) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxviii, 75. (26) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxx, 140. (27) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxviii, 220. (28) Surg., Gynec. and Obst., 1925, xl, 87. (29) Jour. Am. Med. Assn., 1925, lxxxiv, 1262. (30) AM. JOUR. OBST. AND GYNEC., 1925, ix, 295. (31) Surg., Gynec. and Obst., 1925, xli, 655. (32) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 51. (33) Jour. Am. Med. Assn., 1925, lxxxiv, 1798. (34) Bull. Soc. d'obst. et de gynéc. de Par., 1925, xiv, 436. (35) Surg. Clin. N. Amer., 1925, v, 1127. (36) Lancet, 1925, i, 656. (37) Boston Med. and Surg. Jour., 1925, xcii, 163. (38) Med. Klin., 1925, xxi, 1107. (39) Biol. Méd., 1925, xv, 1. (40) Zentralbl. f. Gynäk., 1925, xlix, 1226. (41) Surg., Gynec. and Obst., 1925, xli, 320. (42) AM. JOUR. OBST. AND GYNEC., 1925, xli, 320. (43) Jour. Am. Med. Assn., 1925, lxxxiv, 432. (44) AM. JOUR. OBST. AND GYNEC., 1924, viii, 7. (45) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 360. (46) Surg., Gynec. and Obst., 1925, xli, 353. (47) Jour. Am. Med. Assn., 1925, lxxxv, 488. (48) AM. JOUR. OBST. AND GYNEC., 1925, ix, 673. (49) Bull. Soc. d'obst. et de gynéc. de Par., 1925, xiv, 668. (50) Surg., Gynec. and Obst., 1925, xl, 428. (51) Can. Med. Assn. Jour., 1925, xv, 494. (52) AM. JOUR. OBST. AND GYNEC., 1925, ix, 47. (53) Jour. Am. Med. Assn., 1925, lxxxv, 406. (54) AM. JOUR. OBST. AND GYNEC., 1925, x, 765. (55) Bull. Johns Hopkins Hosp., 1925, xxxvi, 411. (56) Arch. f. Gynäk., 1925, cxxiv, 595. (57) Arch. f. Gynäk., 1925, cxxv, 650. (58) Modern Views on the Toxemias of Pregnancy, New York, Paul B. Hoeber, Inc., 1925. (59) Jour. Am. Med. Assn., 1924, lxxxii, 82, 266. (60) Bull. Johns Hopkins Hosp., 1923, xxxiv, 51. (61) AM. JOUR. OBST. AND GYNEC., 1923, v, 400. (62) Jour. Am. Med. Assn., 1923, lxxxi, 295. (63) Acta Gynecologica, Scandinavica, 1924, iii, 122. (64) Rev. Franc. de gynéc. et d'obstét., 1925, xx, 577. (65) Zentralbl. f. Gynäk., 1925, xlix, 2865. (66) Surg., Gynec. and Obst., 1925, xli, 194. (67) Illinois Med. Jour., 1925, xlvii, 100. (68) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 25. (69) Wien. med. Wehnschr., 1896, xli, 1812. (70) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 164. (71) Arch. f. Gynäk., 1925, cxxiii, 337. (72) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 139. (73) AM. JOUR. OBST. AND GYNEC., 1925, ix, 808. (74) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 206. (75) Arch. f. Gynäk., 1925, cxxv, 653. (76) AM. JOUR. OBST. AND GYNEC., 1925, ix, 189. (77) AM. JOUR. OBST. AND GYNEC., 1925, ix, 327. (78) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 391. (79) AM. JOUR. OBST. AND GYNEC., 1925, ix, 178. (80) AM. JOUR. OBST. AND GYNEC., 1925, ix, 167. (81) AM. JOUR. OBST. AND GYNEC., 1925, x, 823. (82) Arch. f. Gynäk., 1925, cxxv, 655. (83) Principles and Practice of Obstetrics, 4th Ed., Philadelphia, ed. 4, W. B. Saunders Co., 1924, p. 376. (84) Obstetrics, New York, ed. 4, D. Appleton and Co., 1921, p. 568. (85) Zentralbl. f. Gynäk., 1925, xlix, 225.

(To be continued)

Selected Abstracts

Pregnancy Complicated by Disease

Robinson: Heart Disease in Pregnancy. *Journal of Obstetrics and Gynaecology of the British Empire*, 1923, xxx, 172.

The diagnosis and prognosis of cardiac lesions complicating pregnancy depends on three factors: interpretation of the murmur, estimation of heart efficiency and a study of impulse conductivity to explain irregularities. Murmurs may mean little in the presence of a good physiologic reserve. The signs of heart failure appear in the following order: distress after effort shown by cardiac pain, increase in the respiratory rate and air hunger, increased pulse rate, and edema over the lung bases. Congestion and effusion follow. Cyanosis, orthopnea, hepatic enlargement and dropsy are late signs of failure.

Most cardiac irregularities do not of themselves contraindicate pregnancy. Auricular fibrillation, present in 90 per cent of all severe cardiac failure is common in mitral stenosis and is therefore frequently seen in heart disease during pregnancy. This irregularity reduces the heart's output by 40 per cent and contraindicates pregnancy. Six patients seen by Mackenzie were all dead two years after labor.

Pregnancy influences the heart and circulation through the increased weight of the patient and enlargement of the uterus, the vascular demands of the breast, uterine and placental circulations, pressure of the uterine tumor against the diaphragm and lastly through the muscular effort incident to labor.

The responsibility of pregnant women with cardiac trouble rests jointly between the physician and the obstetrician. Maintenance of cardiac reserve, its improvement if possible, and the early detection of heart failure are the aims of the physician. The duty of the obstetrician lies in the supervision of labor and the choice of the best method of delivery.

Strict supervision, restricted activities, graduated exercises, fresh air and nourishing food are necessary during pregnancy. In treating and preventing heart failure, the chief medical measures are morphine, digitalis, strophanthin, caffeine, and theocin in the presence of dropsy, and venesection when the right heart dilates.

The premature termination of pregnancy is justified in the early months when signs of incipient failure appear in aortic disease or in the presence of progressive decompensation in mitral stenosis. The induction of premature labor is a sound precaution in any type of heart disease, as soon as the child is viable. Restore compensation before delivering any patient who has serious heart failure in advanced pregnancy. That medical treatment is preferable to the induction of labor during failure is proved by the patients that accidentally go into labor.

Unavoidable heart strain during labor is reduced by the induction of premature labor, the use of narcotics, avoidance of voluntary effort and the use of forceps at the onset of the second stage. Cesarean section will probably give better results in the grave types of disease, especially in primigravidae, in the presence of obstruction or when in advanced pregnancy severe failure has just responded to medical treatment. Permanent cardiac disability may follow as a result of childbirth. Endocarditis is likely to recur. Repeated pregnancies are therefore forbidden to women with heart disease.

H. W. SHUTTER.

Schmidt, H. R.: *The Significance of Heart Failure in Pregnancy*. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1923, lxiv, 279.

To evaluate the effects of heart failure in pregnancy we must consider not only the mortality of this complication during pregnancy but also during labor and for a long time after labor. Many cardiac patients who do not suspect any trouble with their hearts begin to show symptoms only after labor. Baisch made late examinations of two hundred cardiac patients who had heart trouble during pregnancy, and found that 50 per cent remained well, 45 per cent suffered decompensation, and 5 per cent had died.

Schmidt reports 38 cases of heart failure among 10,027 labor cases (0.38 per cent). Five of these women died in the hospital during the puerperium and 8 more died within a year and a half postpartum. Of 12 patients with mitral stenosis, 6 died immediately after labor. The most serious cases are those in which there is myocarditis, as evidenced by irregularity in pulse and circulatory stasis (confirmed by autopsy). Of 12 patients with myocarditis only 2 made complete recoveries.

Disturbances in heart function are not due to mechanical factors caused by pregnancy as shown by the fact that 39.1 per cent of the patients had decompensation during the first three months of pregnancy. Responsibility rests chiefly with the increased demand on the heart muscle made by the increased blood volume. Of Schmidt's patients who had suffered decompensation during pregnancy, almost one-half died within one and one-half years postpartum.

In the cases of valvular defect where the heart muscle is good the heart stands the strain of pregnancy very well. In the cases of cardiac insufficiency, the earlier the decompensation the worse the prognosis. One should interrupt pregnancy early and sterilize the patients at the same time because of the very likely recurrence in a subsequent pregnancy. Mild cases may be carried to term, but then one faces the danger of labor, which imposes the greatest strain on the heart.

J. P. GREENHILL.

Wagner, G. A.: *Cardiac Deaths in Pregnancy and Labor*. *Medizinische Klinik*, 1925, xxi, 1107.

Hardly any complication in pregnancy arouses as much difference of opinion as that of cardiac disease. At one extreme is the pessimistic mortality figure of Hart (87 per cent) and at the other is that of Prassulides (0 per cent). Wagner feels that cardiac disease is a serious condition in pregnancy and labor. The variability in statistics is due to the fact that the majority of heart lesions are overlooked in pregnancy, that in some cases the series studied is too small to be of value, and that some authors limit themselves to valvular lesions.

In Wagner's series were 86 women with heart trouble among 8,000 patients (1.06 per cent). Among these and among patients admitted after delivery there was a mortality of 14 per cent where heart lesions were directly or indirectly responsible for death. In addition to the 12 deaths reported there were 18 patients in whom pregnancy was terminated early because of decompensation.

In 40 to 45 per cent of these cases decompensation occurred in the first few months of pregnancy.

Even if pregnancy does not produce trouble, labor often does. The increasing amount of pain raises the blood pressure and the increased intraabdominal pressure disturbs the blood distribution. More important still is the actual pressing downward. Because of the bad effect of straining and of pain, an anesthetic should always be used, preferably ether or ethylene.

Of the 12 women who died, 6 had previously had decompensation. Of 15 other patients who had decompensation in labor but who recovered, 2 had decompensa-

tion early in pregnancy and 7 late in pregnancy, while 6 previously had no symptoms referable to the heart. On the other hand, there were 36 patients who had no trouble in labor. Of these women 4 had decompensation early and 3 late in pregnancy.

After labor there is a new danger especially in the first few minutes or hours after delivery, on account of the sudden emptying of the abdominal cavity, which permits an inrush of blood into the splanchnic vessels. It can be prevented by application of tight bandages immediately after delivery.

In the puerperium there are new dangers for cardiac patients are very susceptible to infection.

Mitral stenosis is the most serious form of valvular disturbances. Of the 8 deaths from valvular insufficiency 7 had mitral stenosis. This does not mean, however, that not many patients with mitral stenosis go through pregnancy without trouble. Of great importance is the evaluation of the heart muscle. Marked dyspnea, cyanosis, small radial pulse, tachycardia and lassitude speak for myocardial insufficiency.

A most striking phenomenon of the cases of heart disease which are autopsied is the finding of recrudescent endocarditis. This was found in all of the author's cases where valve lesions predominated. Wagner does not believe that where a recurring endocarditis exists at autopsy it is necessarily the cause of death, since endocarditis is such a frequent complication in pregnant women with old heart lesions.

J. P. GREENHILL.

Pardee: Pregnancy Complicating Heart Disease. American Journal of Medical Sciences, 1922, clxiv, 847.

The writer attempts to classify the types of heart lesions as they affect pregnancy. He also makes a functional grouping of patients and determines in what way the strain of pregnancy asserts itself. His success in the treatment lies in the prevention of pulmonary edema. Only if medical treatment does not ward off cardiac failure, interference is indicated. He insists on lessening the burden of labor even to the extent of doing cesarean section.

W. KERWIN.

Herrick: Heart Disease in Relation to Marriage and Pregnancy. New York Medical Journal, 1923, cxvii, 546.

All patients showing signs of decompensation at any period of pregnancy should have medical treatment, preferably in a hospital. The response to medical treatment of the average case of chronic valvular disease of the heart in pregnancy is satisfactory, and the same principles govern the treatment as govern the treatment of such cases not associated with pregnancy.

Induction of labor should never be attempted in the case of a decompensated heart until thorough trial has been made of medical measures. Disregard of this rule has often led to disaster. Hard and fast rules to govern the decision to terminate pregnancy in heart disease cannot be set down. In general, if decompensation occurs early in pregnancy, if it does not respond to medical treatment, if it has been severe despite proper care in previous pregnancies, and if the signs and symptoms indicate serious circulatory defect despite treatment, termination is usually wise.

It should be remembered that if serious cardiac breakdown can be averted, it is wiser not to attempt delivery in advance of term. Cesarean section is rarely necessary. Sterilization should come up for consideration in appropriate cases.

MARGARET SCHULZE.

Frey: Prognosis of Heart Disease in Pregnancy. *Zentralblatt für Gynäkologie*, 1923, xlvii, 1553.

The present report from the Kiel clinic deals with 1000 cases examined. While even healthy normal cases showed increase in the size of the heart in the early months of pregnancy, 4.9 per cent of the cases had definite valvular disease. This gave an opportunity to follow 49 patients to a conclusion, and of these but one died during pregnancy as a result of heart disease, a mortality rate of approximately 2 per cent. Thirty-two of the cases were followed for a considerable period and two of these died, two months and one year respectively postpartum. It is doubtful whether the pregnancy was an important factor in these two deaths. The danger to women with heart disease from pregnancy seems no greater than the danger from intercurrent disease.

The grave danger to women in the early hours and days of the puerperium may probably be attributed to altered circulatory conditions.

The prognosis in mitral stenosis is in no way particularly bad, since in general prognosis depends rather on the condition of the heart muscle. Occasionally cardiac cases die from purely mechanical conditions arising during labor, which may result in new inflammatory processes on the valves or further damage to the myocardium.

Interruption of pregnancy is recommended in all cases of acute endocarditis at whatever stage of pregnancy. Only in cases in which decompensation resists treatment, the pregnancy should be terminated. The question of sterilization at the time of operation depends on the severity of the heart condition. LITTLE.

Cleisz, L.: Therapeutic Indications in Pulmonary Tuberculosis Associated with Pregnancy. *Gynécologie et Obstétrique*, 1923, vii, 224.

The author gives an extensive critical review of the discussion at the Academy of Medicine and concludes that it is difficult to lay down any fixed rules because of our inability to accurately prognosticate the effect of pregnancy on women afflicted with tuberculosis. ADAIR.

Ward: Marriage, Pregnancy, Parturition and Tuberculosis. *The Lancet*, 1923, ccv, 557.

The effect of marriage alone in 125 tuberculous women was: 60 per cent were unaffected, 26 per cent were better and 14 per cent were worse. From this it may be concluded that tuberculosis is unaffected or improved by marriage in about 90 per cent of all tuberculous women.

Out of 423 pregnancies in 237 women, 53 per cent showed no particular effects, 16 per cent showed an improvement, while 31 per cent of the patients were made worse. Some cases were found to be remarkably improved by pregnancy, others were made worse, but in general, about 70 per cent, were either unaffected or improved by the pregnancy.

Out of 442 labors in 240 patients, 32 per cent showed the patient unaffected, 19 per cent were better, and in 49 per cent the patient was definitely worse.

The value of induced abortion in tuberculous women is very questionable.

Of the offspring from the labors mentioned, 372 were studied. Of these, 45 per cent were seemingly well, 34 per cent tuberculous, of whom one-quarter died of the disease.

In summing up, the author finds that a tuberculous woman loses nothing by marriage alone. He believes it is unlikely to affect her either way. If it does affect her, it is more than twice as likely to improve her condition.

Pregnancy and parturition are likely to make her worse. There is a 50 per cent chance of this against a 19 per cent chance of improvement.

The children born of such wedlock are seven times as likely to be tuberculous as those of healthy people.

NORMAN MILLER.

Pankow, O.: What Is the Correct Therapy in the Treatment of Pregnancy Complicated by Pulmonary Tuberculosis? *Monatsschrift für Geburtshilfe und Gynäkologie*, 1923, lxii, 109.

Approximately 75 per cent of all cases of manifest tuberculosis are aggravated by pregnancy. During the early months of pregnancy, the progress of the tuberculous process is slow but during the later months and more particularly during the puerperium, very acute exacerbations may occur. No one can foretell the prognosis in the early stages of tuberculosis associated with pregnancy. Hence, it is impossible to separate the so-called favorable from the unfavorable cases and claim that pregnancy should be interrupted only in the latter cases. In the author's series of cases, the patients in whom the prognosis had been considered as favorable and therefore permitted to continue their pregnancy had a higher late mortality than the patients in whom a bad prognosis had been given and therefore had their pregnancy terminated. The author, therefore, believes that instead of individualizing pregnant women who have tuberculosis, all should have their pregnancies terminated. During the first half of pregnancy in the mild cases of tuberculosis good results are obtained in every case. In the more advanced cases, interruption of pregnancy gives better results than allowing the patients to continue their pregnancies. In the second half of pregnancy the same holds true except the patients with very advanced tuberculosis cannot be helped by interrupting the gestation. Another reason for interrupting pregnancy in tuberculous women is that the majority of children die during labor (because many are premature) or during the first year of life.

J. P. GREENHILL.

Neumann, W.: Clinical Experiences in Tuberculosis Complicating Pregnancy. *Medizinische Klinik*, 1923, xix, 422 and 461.

The prognosis and treatment of tuberculosis complicating pregnancy are made dependent upon a new classification of pulmonary tuberculosis. The basis for this classification is the mode of dissemination of the tuberculous process; that is, whether it is lymphogenous, hematogenous or intracanalicular by way of the bronchi.

The first and most important group includes the cases where the spread of infection is bronchogenous. To this class belong the cases of ordinary phthisis, phthisis fibrocascosa, phthisis fibrosclerosa and tuberculous cavities. During pregnancy in all these forms the process seems to be arrested, but immediately after labor it spreads rapidly. This is due to the fact that during pregnancy, as the uterus grows and the intraabdominal pressure increases, a sort of pneumothorax is produced with diminution of pulmonary activity. When, however, the uterine contents are suddenly expelled the lungs expand as much as previously and tuberculous masses are aspirated from the apices to the bases of the lungs. In this way a bronchopneumonia is produced.

Interruption of a pregnancy for tuberculosis after the third month has exactly the same effect as a normal labor, because the lungs which have been set at partial rest suddenly attain their full activity again. Hence, if this form of tuberculosis is present the pregnancy must be interrupted during the first three months of gestation regardless of the appearance of the patient and the lack of symptoms. If the pregnancy is further advanced, there should be no interference. In this group belong all cases that have cavities, bronchopneumonic infiltration, hemoptysis

in the presence of fever, and laryngeal tuberculosis. A characteristic of this group is the phthisic spleen which is moderately firm. Every patient should have an x-ray examination before pregnancy is permitted to continue.

The second group is the one in which the disease has reached the lungs hematogenously. In this group are the cases of *tuberculosis fibrosa densa* and *diffusa* before they rupture into the bronchial tree. Most of these cases have an aggravation of symptoms during pregnancy while in many the puerperium has no deleterious effect. In most of these cases a characteristic hard, sharp-edged, spleen is easily felt. If fever is present, symptoms of cachexia, pleural exudate, pericardial rub, ascites, hemoptysis, and positive sputum, the pregnancy should be interrupted. Laryngeal or surgical tuberculosis is also an indication for emptying the uterus. If the patient gains weight, one may temporize.

The third group is a varied one and contains the cases which have neither cavities nor the characteristic splenic tumor. Here we find abortive apical tuberculosis, bronchial gland tuberculosis and the cases of chronic recurring pleurisy. In these cases also there is often an exaggeration of the patient's symptoms during pregnancy. Interference depends upon the temperature and the body weight. If there is fever in the presence of a progressive loss of weight, the pregnancy should be terminated.

J. P. GREENHILL.

Couvelaire, M. A.: *The Future of Children Born of Women with Pulmonary Tuberculosis.* Bulletin de la Société d'Obstétrique et de Gynécologie de Paris, 1923, xii, 469.

Couvelaire reports a study of 63 babies born of tuberculous mothers. The children of all these women were separated from their mothers immediately after birth. Sixty-one of the children were born alive and were viable. In general children of tuberculous mothers weigh no less than other infants.

During the first month of life 23 out of 61 infants died, a mortality of 38 per cent. This figure is enormous when one considers the mortality of other children raised under the same conditions, and especially when compared with the fetal mortality of 4-6 per cent for all children in France. The gravity of the mother's condition in this respect seemed to play no part.

Most of the children died more or less suddenly. The weight curve after an initial physiologic fall remained stationary for a while and then fell gradually despite proper feeding. These children had a normal or subnormal temperature and they showed no digestive disturbances to account for the rapid decline. Autopsy on a number of these children showed no constant findings. It appears, therefore, that children born of tuberculous mothers are born with a diminished vitality and are invalids from birth.

Of the 38 infants who survived the first month, 2 were exposed to the infection by their mothers and they died. Nearly all the rest remained well. Hence those children who survive the first month have as good a chance of living as any other children during the first year of life.

J. P. GREENHILL.

Debré, R.: *Prevention of Tuberculosis in the Newborn.* Gynécologie et Obstétrique, 1923, vii, 199.

The author calls attention to the necessity of recognizing tuberculosis in the pregnant, parturient, and puerperal woman in order to prevent contamination of the newborn with tubercle bacilli. He believes that a considerable number of infants could be saved and cites five cases which came under his observation where the infants were not apparently infected at birth. They were not in very intimate contact with their mother and yet all acquired tuberculosis and died. He believes in absolute separation.

ADAIR.

Baldwin, J. F.: Hysterectomy in Certain Cases of Pulmonary Tuberculosis; Particularly as an Alternative for Therapeutic Abortion. *Surgery, Gynecology and Obstetrics*, 1923, xxxvii, 201.

The author maintains that a total hysterectomy (preserving the adnexa in younger women) is a preferable procedure to inducing abortion in cases of active tuberculosis complicated by pregnancy. Indications for the procedure are extended to cover nonpregnant women with pulmonary tuberculosis who are "handicapped by monthly loss of blood, profuse leucorrhea, or uterine hyperplasia with all its distressing symptoms of backache, bearing-down, dyspareunia, etc." The author used ether by the open-drop method as an anesthetic and states that fifteen minutes usually suffices to complete the procedure from incision to closure; including support of the vaginal vault, peritonealization of the floor of the pelvis, appendectomy and examination of the gall bladder. Occasionally, he says, the operation may be prolonged when meeting extensive adhesions or when accompanied by a perineal repair, but except under extreme circumstances no competent operator should require more than thirty minutes for an operation of this kind.

CREADICK.

Siebert, F.: Results of Supravaginal Amputation and Castration in Tuberculous Women. *Medizinische Klinik*, 1923, xix, 1150.

Most authors nowadays are agreed that it is best to interrupt pregnancy as early as possible when complicated by pulmonary tuberculosis. Bumm, in 1911, advocated removal of the uterus, tubes, and ovaries in these patients, claiming that castration favorably influences the deposition of fat and stimulates metabolism, thereby increasing the resistance of the body. Since 1918 the radical operation has been performed in the Freiburg Clinic on 26 patients. By doing this operation the puerperium, which is the period of greatest danger to the tuberculous gravida, was eliminated. Lumbar anesthesia was used and in nearly all the cases the operation performed between the second and fourth months of pregnancy. Only 6 women showed menopausal symptoms.

Of the 26 women, 20 were improved, 4 were not improved, and 2 could not be traced. Of those who were improved the tuberculous process was cured in 12, and 1 died after two and half years. The 4 patients who were not improved died from one to eleven months after operation.

J. P. GREENHILL.

Dützmann, M.: Simultaneous Abortion and Sterilization. *Monatsschrift für Geburtshilfe und Gynäkologie*, 1924, lxxv, 189.

The author performed combined abortion and sterilization operations on 69 patients without a single death or complication. His operation is performed as follows: An ordinary colpotomy is done. The uterus is pulled forward into view. Just above the internal os the uterus is opened for a distance of 2 to 3 cm. and the ovum removed with ovum forceps. The uterine cavity is curetted and a pack inserted and led out through the cervix, or the cervical canal may simply be dilated with a sound. There is little bleeding and the contracted uterus is very easily pulled out to the vulva. In full view sterilization is now performed. The tube on each side is clamped and cut, avoiding the tubal artery where possible. Both cut ends are buried in the broad ligaments. A suture is introduced into the anterior layer of the broad ligament, then through the tubal end, and finally through the posterior layer of the ligament but behind the tubal openings. The incision in the uterus is closed and a typical vaginal fixation performed so that the uterine incision becomes extraperitoneal.

J. P. GREENHILL.

Fruhinsholz and Feuillade: Genital Tuberculosis and Pregnancy. *Bulletin de la Société d'Obstétrique et de Gynécologie*, 1924, xiii, 683.

Three cases are reported where tuberculosis of the genitalia was associated with pregnancy. The first patient had a conservative operation and the pregnancy and labor which followed were normal. In the second case the tuberculous condition was not discovered until an operation was performed during the puerperium because of fever. In the third case likewise, the diagnosis was not made until the puerperium. From a study of these cases and from the literature the authors conclude that pregnancy may occur after tuberculosis of the genitalia has been cured medically. In such cases the pregnancies and labors are usually normal.

Pregnancy and tuberculosis may exist simultaneously. Sometimes the association produces no symptoms, but occasionally symptoms of pelvic peritonitis appear and make the diagnosis difficult, or an acute miliary tuberculosis results. Frequently the pregnancy is terminated prematurely with or without complications. When pregnancy continues to term in the presence of an existing genital tuberculosis, the child is apparently normal but sometimes congenitally tuberculous or weakly. A tuberculous tumor may in rare instances cause dystocia in labor. In the puerperium the preexisting tuberculous condition may give rise to symptoms resembling an ordinary puerperal infection or the tuberculosis may engraft itself on tissue, the seat of an ordinary postpartum infection.

J. P. GREENHILL.

Vautrin: Tuberculosis of Ovaries and Pregnancy. *Gynécologie et Obstétrique*, 1923, vii, 193.

The author gives the report of a patient with ovarian and tubal tuberculosis operated upon subsequent to delivery. The patient presented clinical signs of inflammation of the ovary during pregnancy and had an acute attack of pain and inflammation in the lower abdomen beginning on the twenty-second day postpartum.

ADAIR.

Stephens, Wm. E.: Renal Tuberculosis during Pregnancy. *Surgery, Gynecology and Obstetrics*, 1924, xxxix, 750.

The effect of pregnancy upon tuberculous infection of the kidney is deleterious. Nephrectomy is always indicated as soon as the diagnosis is made, if the infection is limited to one kidney. Following the removal of a kidney tuberculin should be administered. Conception is permissible after two or three years if the other kidney shows freedom from tuberculosis.

In the presence of bilateral involvement tuberculin treatment is indicated. Regardless of the moral or religious aspects, sacrificing the child by terminating pregnancy is not justifiable as at best the mother's life is prolonged but a short time by this procedure.

WM. C. HENSKE.

Favreau, M., and Querrioux, F.: Gestation and Nephrectomy for Renal Tuberculosis. *La Presse Médicale*, 1923, xxxi, 146.

The authors review briefly the questions of pregnancy following nephrectomy for renal tuberculosis and of nephrectomy for this condition during pregnancy. It is well known that after this operation the other kidney hypertrophies, and that health is possible with a trifle over one-quarter of the normal amount of kidney substance. Albarran and others have shown that renal tuberculosis is unilateral in the early stages in 70 per cent of the cases, so that nephrectomy is indicated as soon as the diagnosis is established. This holds true ⁱⁿ pregnancy, as the patient will go to term after the operation eight times out of nine without in-

cident. Later development of tuberculosis in the other kidney is not common, and in 11 per cent of the cases (Israel) it is an independent infection; the other cases represent recrudescences of early infections in the remaining kidneys which were present before the nephrectomies.

On account of the compensating renal hypertrophy, pregnancy after nephrectomy is only slightly more dangerous than in other women. In one-third of the cases, some urinary disturbance will be present, such as pyuria, albuminuria, or irritable bladder. Marriage or pregnancy must be forbidden until repeated and careful studies have shown the remaining kidney to be sound and functioning well, and the other organs to be free from infection. No definite time limit can be set. The nephrectomized mother may nurse her baby if her general health is good and the remaining kidney is not affected.

E. L. KING.

Fruhinsholz, A., and Collin, R.: A Case of Acute Tuberculosis (Meningitic and Hypophyseal) at the Beginning of Gestation. *Bulletin de la Société d'Obstétrique et de Gynécologie de Paris*, 1923, xii, 391.

Tuberculous meningitis developed early in a first pregnancy. The patient began to vomit five weeks after the cessation of menstruation and soon was confined to bed because of constant nausea, etc. She was sent to the hospital after a therapeutic abortion had been performed, with the diagnosis of pernicious vomiting of pregnancy. On admission the temperature was subnormal. The pulse varied between 100 and 110 and the patient complained of visual disturbances. The usual treatment for pernicious vomiting was instituted. Despite this, diplopia appeared, the tachycardia increased and there was an oliguria. Suspecting cerebral syphilis, neosalvarsan was given. The blood Wassermann as well as the spinal fluid Wassermann was negative. The spinal fluid showed no abnormalities while examination of the eye-grounds showed papillary stasis. She died two months after the onset of vomiting. A partial autopsy was performed and exudates were found along the basal vessels and on the parietal convolutions. Tuberculous granulations were found on the choroid plexuses and the hypophysis on section showed tuberculosis of the anterior lobe.

This is the second case of tuberculous meningitis which Fruhinsholz has seen where the diagnosis of pernicious vomiting was made instead of the correct one. From the clinical history it is impossible to tell when the vomiting of pregnancy ceases and when the cerebral vomiting begins. The source of infection in these cases is evidently an old focus somewhere in the body, which flares up during pregnancy. Fruhinsholz believes that genital tuberculosis and pregnancy are not incompatible, the latter usually relighting the former. He believes that certain cases of acute tuberculosis which occur during labor arise from an old tuberculous endometritis or salpingitis.

J. P. GREENHILL.

Host: Carbohydrate Tolerance in Pregnancy. *The Lancet*, 1925, ccviii, 1022.

All persons investigated received 50 gm. of chemically pure glucose, dissolved in 200 c.c. of water in the morning on a fasting stomach. Blood-sugar analyses were made beforehand and every fifteen minutes for two hours after the administration of the sugar solution, while the urine was examined every half hour.

Nineteen nongravid women were investigated. These women were not absolutely normal, but had more or less trifling complaints, such as dysmenorrhea, displacements of the uterus, etc. Five of the 19 nonpregnant women acquired glycosuria. None excreted sugar with a blood-sugar rise of less than 150 mg.; in other words, there were none among the 19 with a low renal threshold.

Altogether 39 pregnant women were examined in whom glycosuria had not been previously demonstrated. Thirteen of them were in the first three months

of pregnancy, and the remaining 26 were in the fourth to the ninth months. Eight of the 13 had glycosuria, while 5 were free, and, of the 26 whose pregnancy was more than three months advanced, 10 had glycosuria.

The experiments indicate that glycosuria can be provoked in about 50 per cent of all pregnant women, more often in pregnant than in nonpregnant women, and that it can be produced more frequently early in pregnancy than in the latter months.

The investigation of glycosuria after large doses of glucose, as recommended by many authors, is not valid as a diagnostic aid in pregnancy. The experiments proved that there was a curious and characteristic difference in the blood-sugar rise and position of the renal threshold in the first and second periods of pregnancy. Early in pregnancy the position of the threshold is normal and the blood-sugar rise is often remarkably high, so that glycosuria is due to a marked hyperglycemia and not, as is generally believed, of renal origin. In the latter part of pregnancy, on the other hand, the blood-sugar rise is usually small, but the renal threshold, nevertheless, is often so low that glycosuria frequently occurs, which, therefore, in this stage of pregnancy, can be rightly termed renal. Finally, the work has made it probable that the corpus luteum causes the large and prolonged blood-sugar rise which is characteristic in early pregnancy, while the low renal threshold in the latter months appears to be dependent on the fetus or placenta.

NORMAN F. MILLER.

Crook: The Incidence of Glycosuria during Pregnancy. *The Lancet*, 1925, cviii, 656.

The writer's investigation was based on the examination of the urine of 548 patients during their pregnancy. A total of 1346 urinalyses were made.

Of all the patients, 166 had, at some time or other, sugar in the urine; 23 patients had glycosuria in more than one pregnancy, but not in all. Eight patients had it in all of their reported pregnancies. Of the 166 detections of sugar, 40 were noticed before the twenty-first week of pregnancy, while 126 were first detected between the twenty-first and fortieth weeks, the week showing the largest number being the twenty-eighth.

An interesting table is included showing the occurrence of glycosuria in some of the complications of pregnancy encountered in the cases studied.

NORMAN F. MILLER.

Rathery: Diabetes and Pregnancy. *Le Progrès Médical*, 1925, No. 6, p. 191.

The presence of sugar in the urine of pregnant women may be due either to a lactosuria or a renal diabetes or to a true diabetes.

Lactosuria is much more frequent during pregnancy and labor than in the puerperium. When it does occur during this latter period it is associated with some abnormal mammary function causing stagnation.

Renal diabetes includes those cases where there exists a glycosuria and a normal blood sugar. In view of the possibility of the development of a true diabetes this anomaly should be carefully watched.

According to many authorities the prognosis of true diabetes with pregnancy is extremely doubtful. Rathery, however, feels that this view is too pessimistic. In those cases where the diabetic condition has existed before the onset of the pregnancy and has been kept under control by dietetic procedures the outlook is extremely good. On the other hand, where the diabetic state, despite dietetic regime, becomes progressively worse the prognosis is far less favorable.

The factors indicating the approach of danger are the appearance of acidosis

associated with the excretion of acetone and beta-oxybutyric acid, albuminuria, and a lowering of the carbohydrate assimilation coefficient. The treatment should be the same as though the patient were not pregnant; and pregnancy should be interrupted only where, despite all forms of treatment including the use of insulin, the acidosis increases. The most critical time is during labor because of cardiac failure as diabetic patients are more prone to have weakened cardiac musculature.

THEODORE W. ADAMS.

Gemmel: Menstruation and Pregnancy in Hodgkin's Disease. The Journal of Obstetrics and Gynaecology of the British Empire, 1923, xxx, 373.

A review of the literature on this subject was stimulated by a case of Hodgkin's disease recurring in each of three successive pregnancies and regressing in the intervals. A study of 57 reported cases in women brought out the fact that the condition is usually accompanied by diminution of the menstrual flow. Fourteen out of 17 cases with complete menstrual histories showed varying degrees of oligomenorrhea and amenorrhea. Nearly 50 per cent of cases had their origin during periods of physiologic amenorrhea, before puberty, during pregnancy or after the menopause. Six out of ten parous women with this disease traced the origin of their trouble back to pregnancy and in two others pregnancy complicated the disease. The condition progressed rapidly during pregnancy and did not apparently complicate labor. Death followed labor in a few months in three out of eight cases. Due to the apparent tendency for Hodgkin's disease to originate and progress rapidly during hypofunctioning states of the ovary (i. e. pregnancy) the author feels abortion justifiable, and advisable when early Hodgkin's disease is found in the first months of pregnancy. The woman should be warned against future pregnancies. The probable outlook after the induction of premature labor in advanced Hodgkin's disease does not warrant the procedure.

H. W. SHUTTER.

Aubertin, Charles: Pernicious Anemia of Pregnancy. La Presse Médicale, Jan. 5, 1924, p. 13.

The author is of the opinion, contrary to the views of many authorities, that there is a type of pernicious anemia peculiar to pregnancy, with special hematologic and clinical features, the chief of the latter being the rapidity of cure after delivery. The disease is most often encountered in multiparae, with successive pregnancies (generally associated with prolonged lactation periods), is manifest only during pregnancy, and often recurs in successive gestations. Some of the patients (especially primiparae) give histories of chlorosis before marriage. Many of the patients are luetic.

The patient is as a rule first seen in the seventh or eighth month, but the history dates back to the early part or even to the very beginning of the gestation. The patient generally complains of vomiting of recent origin (which is the effect and not the cause of the anemia), with occasional hematemesis. At times, there is diarrhea. Four cases out of five have slight transient albuminuria. Most patients have some fever. Often, after delivery, the temperature rises. Hemorrhages are rare, in contradistinction to other grave anemias; occasionally there is epistaxis, rarely purpura, at times retinal hemorrhages.

The blood shows the usual findings, with the exception that there is generally a moderate leucocytosis and a polymorphonuclear increase, which are not encountered in the ordinary type or pernicious anemia. The eosinophiles are not decreased, as in an infection.

There are four possible terminations: death during labor, death a few hours

or days after delivery (the most frequent), death weeks or months later, or rapid cure after delivery, with a rapid return of the blood picture to normal. This puerperal improvement is characteristic, and is more marked than the recovery from any other variety of grave anemia, except the hemorrhagic type. But the improvement is absolutely dependent on delivery; general treatment is of value only when this has been accomplished, naturally or artificially.

No cause of the condition can be assigned; it is probably an autointoxication of pregnancy.

E. L. KING.

Rumpf: Pernicious-like Anemia in Pregnancy. *Deutsche medizinische Wochenschrift*, 1923, xlix, 436.

In addition to a case observed by himself, Rumpf collected 113 cases of pernicious or pernicious-like anemia occurring during pregnancy. In 34 cases the data were very meagre. The total mortality was about 58 per cent, for both types. While practically unknown in some countries, it is not so exceedingly rare in others.

Even during normal pregnancy the hemopoietic system is often disturbed, normoblasts, micro- and macrocytes being frequently found in the blood. This condition is exaggerated in toxic conditions and especially in eclampsia. It is thought that the various lipoids found in the blood of pregnant women are a causative factor.

The exaggerated disturbance of the blood, pernicious anemia and similar conditions, in 80 per cent of the cases occur in multiparae. In addition to the yellowish white skin, there is asthenia, anorexia, sleeplessness, palpitation, edema, and disturbances of sight and hearing. Labor is premature in 90 per cent of the cases; it is usually rapid and relatively painless. There is little blood loss, but usually a pinkish fluid escapes. The blood of the infant may be quite normal.

The treatment of choice is direct blood transfusion which may cause most remarkable results and save life, as in Rumpf's case. If the patient survives, there is a tendency towards complete recovery, except in cases of true pernicious anemia.

R. E. WOBUS.

Larrabee: The Severe Anemias of Pregnancy and the Puerperium. *American Journal of Medical Sciences*, 1925, clxx, 371.

Larrabee has observed 17 cases of severe anemia beginning during and shortly after pregnancy, not due to obvious complications, but apparently resulting from the gravid state per se. He groups them into different classes and gives reports of seven cases with the blood picture of secondary anemia, the average lowest hemoglobin being 35 per cent. The anemia was not progressive and all began to improve at once after delivery. Symptoms began during pregnancy in four cases and immediately after delivery in two. Five had had numerous pregnancies the average being seven. There were eight patients with the pernicious blood picture, four occurred in pretransfusion days and three of them died. Four were transfused and all recovered. Five had fever, and the cases developed more slowly and had a more gradual onset after pregnancy than was seen in the group with secondary anemia. One patient with the aplastic blood picture received two transfusions with no effect and died three weeks later. An atypical case with seven transfusions required splenectomy. This patient recovered.

W. KERWIN.

Ohlsson, I.: A Case of Leucemia and Pregnancy. *Acta Gynecologica Scandinavica*, 1925, iii, 317.

In the literature are reported only 12 authentic cases of leucemia during pregnancy. Of these, pregnancy occurred in four patients who already had leucemia,

while in the remaining 8 cases the leucemia was recognized for the first time during pregnancy. The author adds the history of his own case.

Among the 13 cases there were both the acute and chronic forms of leucemia. Among the six cases with acute leucemia there were five deaths. In all of the chronic cases the disease progressed during pregnancy. The most critical period is the puerperium. Five of the patients with chronic leucemia recovered.

Leucemia may deleteriously affect pregnancy as indicated by the fact that four patients had a spontaneous miscarriage or premature labor. Where leucemia exists in a pregnant woman the pregnancy should be interrupted. In none of the reported cases did the newborn baby have leucemia. Microscopic examination of the placenta in one case showed that the blood in the chorionic villi was normal but the blood in the intervillous space was leucemic.

J. P. GREENHILL.

Boreel: A Case of Icterus Gravidarum. *Nederlandsch Tijdschrift voor Geneeskunde*, 1924, i, 1018.

The patient was a woman who had been pregnant four times during her five years of married life. Each time she became icteric in the third month and aborted in the fourth month. On admission to the hospital in March she was found to be pregnant for the fifth time, approximately four and one-half months. She was quite icteric, her stools were light in color, and the urine contained bile salts. Otherwise she presented no abnormalities, except a general asthenia. The liver, however, was slightly enlarged but not tender, nor did she complain of pain. She was the only living child of a mother who also had numerous abortions and several premature children. She, too, had been icteric during each pregnancy.

Under bed rest and restricted diet the icterus did not completely clear up. In July she gave birth to a child which was not definitely icteric, but became so soon after birth and died the next day. The mother cleared up after delivery, and after twelve days the bilirubin content of the blood was normal. Neither the most exhaustive examination of the mother before and after confinement, nor a careful autopsy of the fetus threw any light on the cause of the icterus.

R. E. WOBUS.

Duvergy and Dax: Pyelonephritis in Pregnancy. *Journal de Médecine de Bordeaux*, June 25, 1923, p. 442.

The predilection of this condition for the right kidney is due to the normal dextroversion of the pregnant uterus, the mobility of the right kidney, and the resulting obstruction, retention, and predisposition to infection. Urinary examination in pyelonephritis reveals a bacteriuria in the early stages; pus and epithelium, later. Where kidney impairment is occurring, the urine from the side involved shows a low specific gravity. Tenderness over the costovertebral angle is usually accompanied by some tenderness along the course of the ureter as well.

The medical treatment of this condition consists of posture, catharsis, fluids in large amounts, autogenous vaccines, and the daily intravenous injection of one gram of urotropin in 10 c.c. of sterile water. When relief is not obtained by the above measures one must not hesitate to catheterize the ureter. Frequently it is advantageous to leave the catheter in place to favor drainage or relieve back pressure on an impaired kidney. Where ureteral catheterization is impossible and kidney destruction is occurring, the induction of premature labor or nephrotomy may be necessary.

H. W. SHUTTER.

Hewitt: Bacterial Infection of the Urinary Tract Complicating Pregnancy and the Puerperium. *The Journal of Obstetrics and Gynaecology of the British Empire*, 1923, xxx, 390.

Since a large percentage of centrifuged urine specimens from healthy women will show pus and bacteria, the author concludes that these findings should be demonstrable in a single uncentrifuged drop of fresh urine, if active infection exists. He considers this the most valuable laboratory test for pyelitis. Pus cells are frequently not found in the urine of very early cases, in chronic cases, in the presence of temporary retention of the renal pelvis, or when large amounts of water are being taken. Colon bacilli were found with or without other organisms in 30 out of 31 cases of pyelitis complicating pregnancy. The use of urinary antiseptics proved unsatisfactory in 19 cases and the next 15 were treated by alkalization. In only one of the 15 cases did pregnancy terminate prematurely as against 7 cases of premature labor and 4 inductions in the 19 cases treated with antiseptics. Seven stillbirths occurred in the cases treated with antiseptics, none in the others.

There were recurrences in three cases which originally had alkaline treatment but in whom the further use of antiseptics was not carried out. Subsequent attacks may be more or less severe than the first. Premature labor is not uncommon in secondary attacks. Vaccines were of no value in the author's cases. The induction of premature labor, necessary four times in the cases treated with hexamine, was never employed in the other group.

H. W. SHUTTER.

Vozza, F.: A Case of Pyelitis of Pregnancy Caused by B. Typhosus. *Annali di Ostetricia e Ginecologia*, 1924, xlv, 149.

Although bacilluria is common in typhoid fever, suppurative infections of the kidney and its pelvis by the *B. typhosus* are rare. The author has been able to find only two such cases complicating pregnancy reported in the literature, to which he adds the report of a third. The patient in the seventh month of her third pregnancy developed symptoms of a right sided pyelitis beginning some twelve days after the onset of typhoid symptoms, and three days before admission to the clinic. Her serum agglutinated *B. typhosus* from 1:20 to 1:320, paratyphoid B from 1:20 to 1:40, and paratyphoid A from 1:20 to 1:80. Her urine showed albumin, and a heavy sediment composed of pus, bacilli, and many casts composed of bacteria, the culture of which showed them to correspond morphologically and culturally to bacilli obtained from blood following a chill which were identical with *B. typhosus*. The patient went into labor spontaneously six days after admission and delivered herself spontaneously of a baby slightly under three pounds which lived four days. After delivery the patient showed marked improvement, and convalescence began fourteen days after admission. Bacilluria persisted twenty days after cessation of symptoms despite administration of urotropin. The author regards the case as one of blood-borne infection, to which pregnancy was a predisposing factor by partial obstruction of ureters, especially the right.

THOS. R. GOETHALS.

Vignes: Cervical Carcinoma and Gestation. *Le Progrès Médical*, June 18, 1921, p. 289.

Because of the difference in the age limits and because a malignant cervical growth, even in the earliest stages, acts as a barrier to impregnation, carcinoma rarely complicates pregnancy. In general it may be stated that pregnancy augments any neoplastic growth, this being especially true if such growth is located within the generative tract. Because of the increase in the blood and lymph

supply to the generative organs during pregnancy, the frequency and rate of metastasis is also augmented.

The diagnosis may usually be made early on account of the small acute hemorrhages alternating irregularly with a foul-smelling profuse vaginal discharge. The anemia is usually marked, and pain is present when there is involvement of the broad ligaments. Bladder symptoms and hematuria may also appear.

Vignes finds that about one-third of such patients abort spontaneously, due either to an infective or malignant process extending upward and involving the lower uterine segment. In those patients where pregnancy has gone to term and labor has started spontaneously, there may be sufficient healthy cervical tissue left to permit dilatation. When dilatation cannot take place the patient may suffer a severe laceration of the cervix. On the other hand no tears or dilatation may occur, so that birth would be prolonged indefinitely were it not for operative interference.

In those cases which are clearly inoperable, the author advocates allowing the pregnancy to continue in an attempt to save the child, while in operable or doubtful cases the benefit should be given the mother.

THEODORE W. ADAMS.

Schweitzer: Complication of Pregnancy with Carcinoma. *Zentralblatt für Gynäkologie*, 1923, xlvii, 657.

The writer reports 11 cases of carcinoma complicating pregnancy observed in the Leipzig Clinic. The frequency was about 0.05 per cent, but he believes the actual frequency is greater as many cases remain unrecognized during pregnancy. The condition is infrequent in primiparae, but seems to have some relationship to rapidity of childbearing. In the majority of cases the pregnancy is a complicating factor, and apparently the growth of the carcinoma is unfavorably influenced by the pregnancy. In most cases bleeding was noticed for the first time only during the pregnancy, but the carcinoma probably had been present for a considerable time before bleeding commenced, and thus bleeding is not a noteworthy symptom of carcinoma complicating pregnancy. The irregular bleeding may make the definite diagnosis of early pregnancy difficult.

As for the influence of the carcinoma, on the pregnancy he finds that if early, it may have little effect, though there is always the possibility of premature interruption of the pregnancy and with this always the danger of infection. Carcinoma may make dilatation of the cervix difficult, and extensive laceration of the cervix may result.

As for the influence of the pregnancy on the carcinoma, opinions differ, though there is more or less agreement as to the increased operability and better results of operation in these cases. Schweitzer is under the impression that the trauma of birth undoubtedly influences carcinoma unfavorably.

The results of operation in the puerperium are not so good as when the operation is undertaken earlier. The prognosis is always grave, but of these eleven cases, one handled with mesothorium, and two inoperable, the eight operated upon healed per primum; and of four operated upon more than five years ago three are living and in good condition. Substantially all of these patients were operated upon in the first half of the pregnancy.

If the carcinoma is inoperable it is treated symptomatically in the interest of the child, and at term the child is delivered by section and the uterus amputated after extraperitoneal fixation of the cervix. If the carcinoma is operable this same treatment may be followed with vaginal extirpation of the cervix as a secondary step. Radiation should be undertaken as an accessory treatment, though radiation during pregnancy is liable to increase the rigidity of the cervix and

render birth more difficult. It does not, however, prevent subsequent pregnancy as shown in a case of Döderlein in which four years after radiation a child was carried to term and born in normal labor. LITTLE.

Davies, J. C.: Labor Complicated by Malignant Growth. *British Medical Journal*, Jan. 14, 1922, p. 57.

The author reports a case of a multipara suffering from inoperable carcinoma of the cervix delivered of a stillborn fetus by podalic version.

F. L. ADAIR.

Emery, C. W. A.: Early Pregnancy and Epitheliomas. *British Medical Journal*, 1924, ii, p. 1149.

Do conditions prevailing in the first trimester of pregnancy contribute to a study of the etiology and treatment of epitheliomas? His answer is "yes."

The author states that the normal body is fully equipped to combat disease and when the body is overcome it is due to a failure of the normal body resistance. The body will resist any invading growth, malignant or not. Thus, when chorion epithelioma can invade the uterine wall, the resistance has been lowered.

There exists an abnormal corpus luteum activity in chorion epithelioma. Possibly overproduction of lutein substances results in completely antidoting the resistance, and invasion of the chorion epithelium continues mildly. Also, luteum secretion acting by lowering the body resistance accounts for the preponderance of cancer in women under forty as compared with men under forty.

ADAIR AND RICE.

Vignes: Growth of Cancer of the Breast during Pregnancy. *Progrès médical*, 1923, No. 33, p. 409.

Cancer of the breast is a rather rare complication of pregnancy, but the experimental development of breast cancer is done more easily in the pregnant than in the nonpregnant animal. In the cases in which cancer complicates pregnancy the malignant development is hastened, and metastases form more readily.

Lactation often causes a more rapid growth of the malignant tissue than pregnancy. On the other hand, immediately following delivery, in those patients in whom nursing is prohibited, there is often seen a temporary regression of the tumor.

The author cites several cases in which one breast had been removed for malignant growth and in which during a subsequent pregnancy a rapidly developing carcinoma appeared in the remaining breast. THEODORE W. ADAMS.

Odermatt, W.: Carcinoma and Pregnancy with Especial Reference to Mammary Carcinoma. *Schweizerische Medizinische Wochenschrift*, 1924, liv, 385.

The author has collected from the literature 170 cases of breast cancer complicating pregnancy and adds 34 cases of his own. The period of gestation, puerperium and lactation are all influences favorable to development of newgrowths. It is an open question whether the serum of the fetus may in anyway affect the newgrowth. After breast operation, transfusion may be necessary, and if so it appears that the blood taken from young donors under twenty may be of more value even than that taken from older patients who have been operated upon for carcinoma and afterward treated with radium and x-ray. Mammary carcinoma may be dormant for some time and begin to grow with the start of pregnancy. Chronic

mastitis may develop into a malignancy under such conditions. If the case is seen early and there are no evidences of metastases and the patient has not passed her fifth month, radical operation is the choice procedure. After the fifth month, usually nothing avails. It cannot be disputed that pregnancy favors the very rapid growth of cancer and encourages the development of malignancy from the precancerous stage. Interruption of pregnancy before the end of the fourth month may delay the growth, but interference after that time is of little value. Future pregnancies in patients operated for carcinoma should be strictly forbidden. There is a possibility that children born to mothers suffering during gestation from a malignant neoplastic growth, if not directly inheriting cancer, may possibly inherit a tendency to new growth.

A. C. WILLIAMSON.

Cotte and Cryssel: Myomectomy During Pregnancy. *Archives Franco-Belges de Chirurgie*, 1922, xxv, 777.

From a review of 85 cases in recent literature, the authors feel justified in dividing the indications for interference into two groups. First, those in which exists some complication of the fibroid, such as torsion, gangrene, or infection. In these cases immediate operation is indicated, irrespective of the danger of inducing abortion.

In the second group fall all cases of uncomplicated fibroids. Here the proper procedure depends upon two factors; namely, the symptoms produced, and the probability of dystocia. They advocate no interference in those cases where there are no symptoms and the probability of dystocia is negligible. If, on the other hand, the tumor mass is of sufficient size, or in such a location that it is apt to give rise to difficulty during labor, they advise removal of the neoplasm rather than interference at term, which almost invariably results in cesarean section and hysterectomy. Again, where pain, bleeding, or pressure symptoms are present, interference and careful myomectomy are justifiable, as the authors found that only about 17 per cent of cases treated in this way terminate in abortion. In such cases great emphasis is laid on careful handling of the uterus, with the least possible trauma during operation.

THEODORE W. ADAMS.

Boije, O. A.: Conservative Myoma Operations during Pregnancy. *Finska Läkarsällskapets Handlingar*, 1923, lxv, 530.

Only rarely the necessity arises to remove a uterine myoma in the course of pregnancy; namely, when the tumor interferes with further progress of pregnancy, when it is likely to become an obstacle to the expulsion of the fetus, and finally when pain or peritonitic symptoms suggest serious complications. One of the four recorded cases, a large broadbased subserous fibroid, was removed for the first named indication in the fifth month of gestation. The following were extirpated as probable obstacles: an intraligamentous cervical myoma, the size of the fist, in third month, and a slightly smaller tumor, in another case, occupying a rudimentary horn, bound down into the pelvis by adhesions, also in third month. In the fourth case, in the third month of pregnancy, a myoma was enucleated from the anterior uterine wall pressing against the bladder.

In all four cases pregnancy continued to term, labor and puerperium being normal in every respect. Since numerous reports in the literature prove that conservative myomectomy predisposes neither to abortion nor to premature labor in a subsequent pregnancy, the writer is convinced of the justification of this operation also during pregnancy in well selected cases. When the tumor lies deeply imbedded, it is best to close the cavity with buried silk sutures, the covering peritoneum always being closed with catgut.

AUTHOR'S ABSTRACT.

The American Journal of Obstetrics and Gynecology

VOL. XI

ST. LOUIS, JUNE, 1926

No. 6

Original Communications

A STATISTICAL STUDY OF THE INCIDENCE AND TREATMENT OF LABOR COMPLICATED BY CONTRACTED PELVIS IN THE OBSTETRIC SERVICE OF THE JOHNS HOPKINS HOSPITAL FROM 1896 TO 1924*

BY J. WHITRIDGE WILLIAMS, M.D., AND KO CHI SUN, M.D.
BALTIMORE, MD.

EARLY in his career the senior author became interested in the study of contracted pelvis, as shown by the fact that one of his earliest publications was entitled "Pelvimetry for the General Practitioner."

When the obstetric department of Johns Hopkins was organized in October, 1896, opportunity was afforded for developing that interest, with the result that the pelvis of every patient has been carefully and accurately measured, and the rule was laid down that the final measurements recorded in the histories must be made either by the chief or his substitute, or by the resident obstetrician (who has had three years of practical training before assuming the post). Consequently, the pelvic diagnoses are reasonably accurate.

It was soon found that our material was especially suitable for the study of the question on account of the large negro population of Baltimore, with its unusual incidence of abnormal pelves; and as the service continued to increase in size the number of negro patients became disproportionate to their share of the population, and latterly we have deliberately allowed it to exceed that of the white patients. For this reason, we have been able to study the conditions in the two races concurrently and to establish certain important and fundamental differ-

*Read in abstract before the New York Obstetrical Society, January 12, 1926.

NOTE: The Editor accepts no responsibility for the views and statements of authors as published in their "Original Communications."

ences between them. Furthermore, the fact that the service has been under a single head since its inception has made it possible to study in a comprehensive manner the differences in results for both mother and child incident to the several methods of treatment which have been employed during the twenty-eight years under consideration.

In 1910, the senior author analyzed the pelvic conditions observed in the first 4,500 admissions to the service, but did not publish the results, and in 1923, he suggested to the junior author the advisability of continuing the study. Accordingly, a special sheet was prepared, and was filled out with great accuracy and industry by Dr. Sun for every labor complicated by contracted pelvis occurring in the indoor service from history 4,501 to 14,000 (October, 1924). These sheets made readily available whatever information was necessary, and they were tabulated and correlated by the senior author. The results thus obtained, after being combined with those collected in 1910, constitute the material upon which the present study is based.

Frequency.—During the entire period, 14,000 patients were admitted to the indoor service, and of these 11,630 individuals gave birth to 11,925 children which had passed the period of viability, the remaining 2,075 admissions being made up of abortions, women admitted postpartum or discharged before delivery, or who were not pregnant. Of the 11,630 individuals concerned, 6,407 were white and 5,223 black, and 3,100 of them presented contracted pelvises. Routine measurement of the pelvic outlet was instituted only after admission No. 2,000. As the entire question of funnel pelvis will be considered in another communication, that type of abnormality will be excluded from the present study. Consequently, upon deducting the 577 women presenting it, we have for immediate study 2,523 women with the usual types of pelvic contraction, who had 2,975 labors in the service.

It may be mentioned at this point that we have adhered to the classification and standards laid down by Michealis and Litzmann, except in the case of the generally contracted funnel pelvis. Under that heading we have grouped together such pelvises as present the usual characteristics of general contraction, but in which the distance between the tubera ischii is reduced to 8 cm. or less. Furthermore, we have continued in great part to base our classification upon the length of the diagonal conjugate, notwithstanding Zange-meister's plea for the direct instrumental mensuration of the conjugata vera, for the reason that we have been unable to obtain satisfactory results by means of his pelvimeter or by any other device, except in certain cases of extreme contraction occurring in multiparous women.

Table I shows the relative frequency of the several types of contracted pelvis in our white and black patients and seems to justify certain interesting deductions.

This table is so arranged as to show the striking difference in the incidence of contracted pelvises in general in the two races, as well

TABLE I
SHOWING RELATIVE FREQUENCY OF THE SEVERAL TYPES OF CONTRACTED PELVIS IN
WHITE AND BLACK WOMEN

TYPE	WHITE						BLACK					
	1-4500		4501-		TOTAL		1-4500		4501-		TOTAL	
		%		%		%		%		%		%
G. C. Typical	85	4.13	219	5.04	304	4.74	294	18.62	574	15.75	868	16.62
G. C. Funnel*	12	0.58	29	0.67	41	0.64	45	2.84	180	4.94	225	4.31
G. C. Rach.	13	0.63	20	0.46	33	0.52	149	9.43	593	16.25	742	14.21
Simple Flat	53	2.58	103	2.38	156	2.43	11	0.70	33	0.91	44	0.84
Flat Rach.	4	0.19	15	0.34	19	0.30	20	1.27	33	0.91	53	1.02
Atypical	10	0.49	11	0.23	21	0.33	2	0.13	15	0.41	17	0.29
Total	177	8.60	397	9.12	574	8.96	521	32.99	1428	39.17	1949	37.31
Typical Funnel*	75	6.29	214	4.92	289	5.03	53	6.45	235	6.45	288	6.44

*Measured only after admission, No. 2,000.

as the variations in the order of frequency of the several types in white and black women. Furthermore, it enables us to ascertain what, if any, differences exist between the tabulations of 1910 and 1924, respectively.

TABLE II
SHOWING THE ORDER OF FREQUENCY OF THE SEVERAL TYPES EXPRESSED AS PERCENT-
AGES OF THE TOTAL NUMBER OF CONTRACTED PELVIS IN EACH RACE

WHITE		BLACK	
G. C. Typical	35.23%	G. C. Typical	38.80%
Typ. Funnel	33.49	G. C. Rach.	33.17
Simp. Flat	18.07	Typ. Funnel	12.87
G. C. Funnel	4.75	G. C. Funnel	10.06
G. C. Rach.	3.82	Flat Rach.	2.37
Atypical	2.43	Simp. Flat	1.96
Flat Rach.	2.20	Atypical	0.76
	99.99		99.99

Upon considering the total figures, it is seen that in our material the usual types of contracted pelvis occur somewhat more than four times less frequently in the whites (8.96 and 37.31 per cent), while the incidence of funnel pelvis is practically identical in the two races. This at once makes it probable that whatever factors are concerned in the production of the usual types operate more powerfully in the negro, while those concerned in the genesis of funnel pelvis operate approximately equally in the two races.

Furthermore, upon consolidating into a single group the generally contracted and generally contracted funnel pelvises, it is seen that combination is the most usual one in both races, but that it occurs nearly four times more frequently in the blacks (20.93 and 5.38 per cent). Moreover, in white women, the generally contracted pelvis is closely followed by the typical funnel pelvis, while in the black the generally contracted rachitic is the second in order of frequency. Again, upon uniting the generally contracted rachitic and flat rachitic

pelves into a single group, it becomes apparent that rickets plays an extraordinarily important part in the genesis of abnormal pelves in black and an almost negligible one in white women (15.23 and 0.83 per cent). In other words, in our material rachitic pelves occur eighteen and one-half times more frequently in the former. Finally, it should be noted that, while the simple flat pelvis is relatively frequently observed in white women and, in general, may be regarded as the pelvic abnormality par excellence in that race, it possesses but slight significance in black women.

For further clarity, these relationships are expressed in Table II, in which the several types are arranged in their order of frequency, and are expressed as percentages of the total incidence of contracted pelvis in each race. It should be noted that the funnel pelvis has been included in this tabulation, otherwise, the percentages of the other types would be higher.

Reverting to Table I, it is seen that the incidence of abnormal pelvis in our white patients was almost identical in the two periods studied (8.60 and 9.12 per cent), while in the blacks an increase of over 6 per cent had occurred during the second period (32.99 to 39.17 per cent). Such a difference cannot be attributed to increased skill in the detection of pelvic abnormalities, for, if it were, the findings in the white women should exhibit a corresponding change, but, as that is lacking, the increase noted must be due to some other factor. Upon analyzing the figures tabulated, it is seen, if those for the generally contracted typical and generally contracted funnel pelves are combined, that the percentage incidence for the several types in black women shows only insignificant variations, except in so far as the generally contracted rachitic type is concerned; but in that category the incidence has increased from 9.43 per cent in the first to 16.25 per cent in the second period, an increase of 72 per cent. Or, to express it in another way, we now find seven women presenting generally contracted rachitic pelves, instead of four prior to 1910.

This unexpected finding is difficult of explanation, for a priori one would expect that the improved living conditions and greatly increased wages, which the lower classes have enjoyed for many years, would have resulted in a diminution rather than an increase in the occurrence of rickets in general, and of this pelvic abnormality in particular. As our observations indicate the contrary, however, it would appear that the increased prosperity of the negro race in this locality has not had the results anticipated, and in general has not led to increased well-being of their offspring. This is not the place to attempt to study the question in detail, but our experience would seem to indicate that under the influence of urban life, the negro tends to degenerate physically, and the startling disproportion in the incidence of rickets in the two races affords additional confirmation of such a belief. In a general way, it may be said that we are now treating the daughters of the

women delivered during the first period of the activity of the clinic, and it is our impression that, while the frequency of rachitic pelvis has increased, there has, at the same time, been a relative decrease in the number presenting excessive contraction.

Course of Labor.—We shall now consider the course of labor in the 2,274 births complicated by contracted pelvis, which occurred in the second series, 1910 to 1924. Those in the first series have been omitted from our immediate calculation for the reason that they were tabulated in such a manner that their utilization might give rise to certain statistical complications.

Before taking up this study, attention should be directed to the fact that we have somewhat restricted the implication of the term live-birth and have limited it to those cases in which a living child accompanies the mother on her discharge from the Clinic. Such a restriction must necessarily tend to diminish somewhat our conception of what may be accomplished spontaneously by Nature or artificially by operative means; but, nevertheless, we believe that it gives a more correct idea as to what is actually accomplished in the treatment of obstructed labor, as it excludes from consideration the children who die from the effects of disproportion, as well as those succumbing to syphilis, malnutrition, or other causes during the two weeks following delivery.

Excluding 32 labors which occurred in women presenting the so-called atypical varieties of contracted pelvis, such as spondylolisthesis, coxalgia, lumbar kyphosis, etc., there were 2,242 labors in the series: 476 in white and 1,766 in black women.

Fig. 1, in which the ordinates of the graph represent the percentage frequency and the abscissae, the length of the diagonal conjugate, expressed in half centimeters, gives a graphic picture of what occurs in each group, and indicates the great difference in the significance of contracted pelvis in the two races. In the first place, it shows that with every additional half centimeter of contraction the colored woman has more spontaneous and fewer operative labors than the white woman. For example, at the upper limit of contraction, with a diagonal conjugate of 11.5 cm., there were several per cent more spontaneous labors and several per cent fewer operative labors in the blacks; whereas, at the other end of the graph, with a diagonal of 8.5 cm., it is seen that the operative incidence was 100 per cent in white women, while a certain proportion of colored women were still able to expel the child spontaneously.

This difference is due to several factors: in part to the lesser weight of the colored children, but more particularly to the smaller size of their heads, as well as their greater compressibility and malleability. Furthermore, it would seem that the lower nervous organization of the colored woman enables her to withstand with relative impunity a greater intensity of uterine contractions, as well as a longer duration of labor, than the white woman. For these reasons, it sometimes

happens that with an identical degree of disproportion a spontaneous outcome may occur in the former, which would be out of the question in the latter.

These differences become even more striking upon studying Fig. 2, which was constructed to emphasize the difference in the course of labor in the most important type of abnormal pelvis in each race, namely, the simple flat in the white and the generally contracted rachitic in the colored.

This graph, which is based upon the analysis of 135 labors in white and 749 in colored women, shows clearly how much more serious the

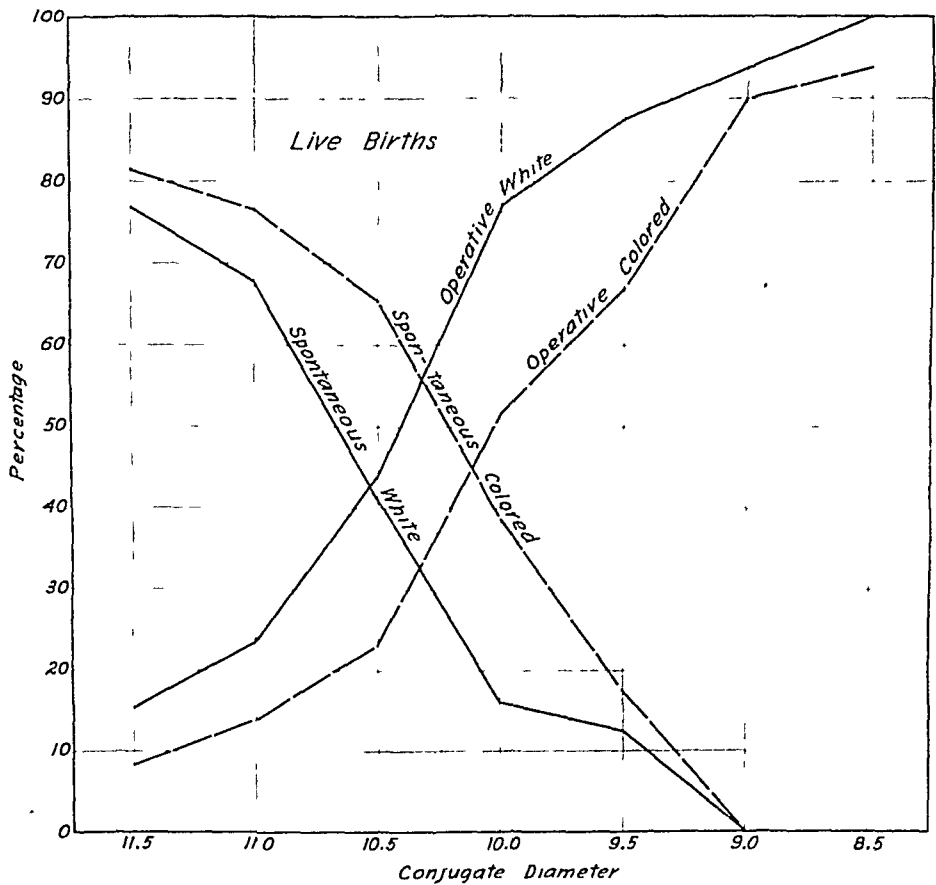


Fig. 1.—Graph showing the number of spontaneous and operative live births, occurring in the two races.

simple flat pelvis is to the former than the generally rachitic is to the latter. In the white woman there are fewer spontaneous and many more operative labors than in the black; and the contrast is further heightened by the fact that, in the simple flat pelvis, the operative incidence becomes 100 per cent when the diagonal conjugate reaches 9.5 cm., whereas in the generally contracted rachitic type spontaneous labor may occasionally occur when the diagonal measures one centimeter less.

From what has been said, no further argument is necessary to prove our contention that the simple flat pelvis constitutes the contracted

pelvis par excellence in the white woman, and in our experience it may give rise to serious dystocia even when mensuration indicates only very moderate anteroposterior shortening. Consequently, we do not hesitate to state that in the white woman a simple flat pelvis, with a diagonal of 10.5 cm., is quite as serious as a generally rachitic one in a colored woman with one-half to one centimeter greater shortening, and that failure to recognize this fact in the past was responsible for the loss of not a few white children.

How can the difference be explained? Very simply to our minds, as the evidence available points to the probability that the generally con-

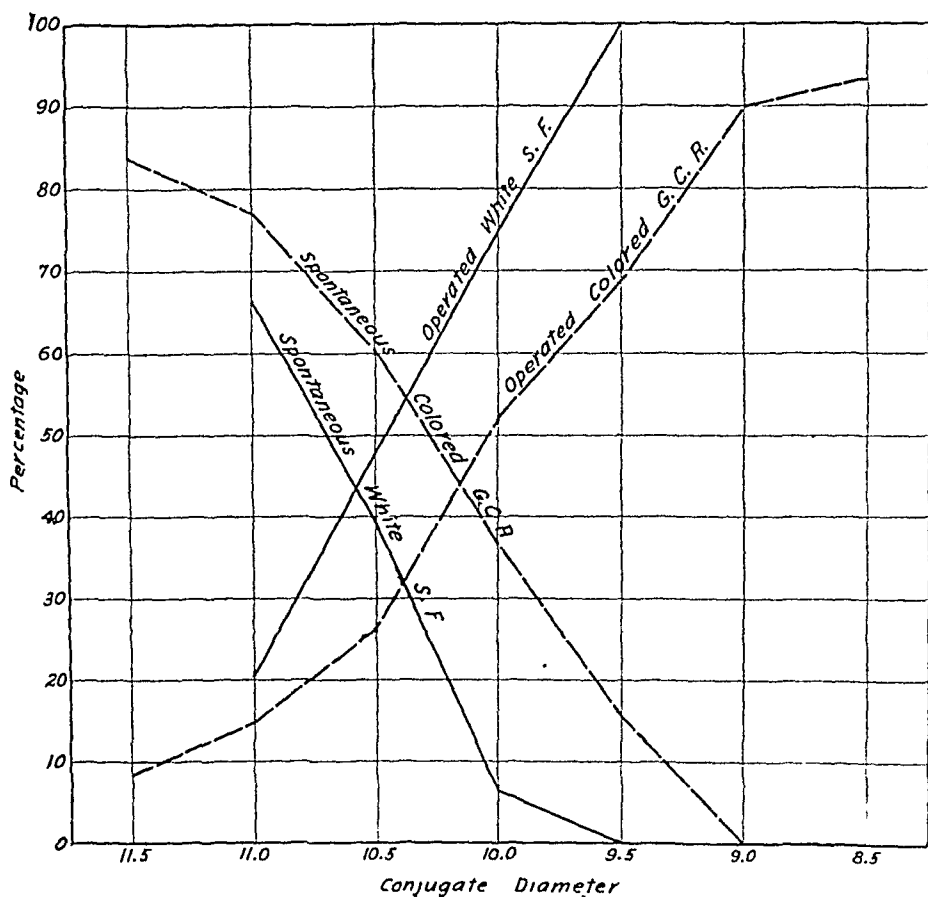


Fig. 2.—Illustrating the course of labor in white women with simple flat, and in colored women with generally contracted rachitic pelvises.

tracted rachitic pelvis should be regarded as a manifestation of degeneration, and that the child takes part in the process, as manifested by its smaller size. On the other hand, white women presenting flat pelvises, as a rule, manifest no signs of physical degeneration, frequently exceed the average in height and weight, and have babies of more than the average size. That this is not a fanciful conclusion will become apparent when we consider, in the last section of this paper, our figures concerning the size of the child. And here it will suffice to say that in both races the largest children are born to patients presenting simple flat or typical funnel pelvises, while the smallest are associated with the

generally contracted types, whether rachitic or not. In other words, it appears that the shortening of the iliac portion of the terminal length of the innominate bone, or the presence of an additional sacral vertebra, which plays the causal part in the production of the two types of pelvis, respectively, cannot be regarded as a sign of degeneration and does not affect the size of the child; whereas the generalized arrest of development which characterizes the bearers of generally contracted pelvises is a manifestation of degeneration and is frequently associated with similar changes in the full-term child.

The considerations just adduced incline us to agree with Zange-meister that doubt should be cast upon the classical statement that in predicting the outcome in a given case, one-half of a centimeter should be added to the length of the conjugate vera of a flat pelvis in order to make it obstetrically equal to a generally contracted pelvis. Theoretically, this is doubtless true, but, as it fails to take into consideration the varying size of the child, it is practically incorrect.

In connection with the course of labor, we can only repeat, in common with all previous writers, that premature rupture of the membranes, as well as prolapse of the cord, occurs more frequently in contracted than in normal pelvises, and that the former adds to the severity of the dystocia, while the latter materially increases the fetal mortality. We shall, however, not attempt to adduce statistical data in support of our statements, for the reason that we have not at our command any comparative figures showing the incidence of such accidents in normal labor.

From the time of Michealis and Litzmann, all writers have emphasized the increased frequency of abnormal presentations in labor complicated by contracted pelvis, and our experience bears out the correctness of their observations, as is shown by the accompanying tabulation:

	NORMAL LABORS	IN OUR SERIES
Vertex	96.0 per cent	92.05 per cent
Breech	3.0 " "	5.34 " "
Face	0.4 " "	0.58 " "
Transverse	0.5 " "	1.77 " "
Compound	0.0 " "	0.27 " "
	<hr/> 99.99 " "	<hr/> 100.01 " "

Accordingly, it would appear that breech presentations occur approximately twice as frequently, and transverse presentations thrice as frequently in contracted as in normal pelvises, which naturally is compensated for by a corresponding diminution in the number of vertex presentations. It is unnecessary to emphasize the point, except to indicate that it necessarily increases the fetal mortality, and in neglected cases adds materially to the danger to the mother.

Owing to the fact that cesarean section at an appointed time before the onset of labor constitutes the ideal treatment of the more serious cases of disproportion, and that in the more moderate ones we limit

vaginal examination to the greatest possible extent during the course of labor, we have an increasingly diminishing opportunity for studying the behavior of the head during its engagement and passage through the pelvic canal. Consequently, we are able to say but little concerning the significance of the so-called anterior and posterior parietal presentations. Indeed, at the present time, practically our only opportunity for such observations is afforded by neglected cases which are brought to us from the outside, or by our own patients in whom we have underestimated the degree of disproportion. So far as our experience goes, we agree with the older writers that the posterior possesses a much more ominous prognostic significance than the anterior parietal presentation. Indeed, it is safe to say that the occurrence of the former inevitably indicates the existence of serious disproportion, which cannot be overcome by the unaided efforts of Nature; whereas the latter usually only represents an exaggeration of the relatively normal Naegele obliquity, is frequently a transient phenomenon, and by no means precludes a spontaneous outcome.

Maternal Results.—After the more or less theoretical and statistical statements thus far adduced, the practical-minded person may inquire what have we really learned about the treatment of labor complicated by contracted pelvis and whether such knowledge has led to the saving of more mothers and children.

TABLE III
SHOWING GROSS AND NET MATERNAL MORTALITY

		FIRST SERIES 701 CASES		SECOND SERIES 2,274 CASES	
		11	PER CENT	18	PER CENT
Total maternal deaths		11	1.57	18	0.79
Less infected on admission or not due to dystocia		4	0.57	12	0.53
Due to contracted pelvis or to service		7	1.0	6	0.26
<hr/>					
Gross Mortality, Both Series		29 = 0.97%			
Net " " "		13 = 0.44%			
<hr/>					
		GROSS PER CENT		NET MORTALITY PER CENT	
Cases	1-2000	1.90		0.95	
"	2001-4500	1.30		1.04	
"	4501-14,000	0.79		0.26	

Tables III and IV will answer these questions briefly, but some discussion may be required to justify the methods employed in converting the gross into the net mortalities. Casual inspection of Table III shows that there were 29 maternal deaths in the 2,975 deliveries in the two series, and that the gross mortality was only one-half as great in the second as in the first series. On the other hand, it is claimed that the actual or service mortality was diminished nearly four times, namely, from 1.0 to 0.26 per cent, and here, in order to carry conviction, it is necessary to consider certain details.

In the first series there were eleven maternal deaths, four of which

were clearly not due to the service. One of these patients (No. 2,229) died from toxemia, with no sign of infection at autopsy, while the other three (Nos. 372, 694 and 2,568) were admitted infected with dead children after futile attempts at delivery by outside physicians, and died later from infection. The remaining seven deaths were due to the service, and included five deaths following cesarean section. One of the remaining two deaths was due to infection following the only symphyseotomy done in the Clinic, and the other was from shock following rupture of the symphysis in a very stout woman. It might be added that the cesarean deaths occurred during our period of learning, and that only one of them followed an elective section, while the other three occurred in patients who were operated upon late in labor and after the development of intrapartum infection, in other words, in the type of case which we now treat by radical or by low cervical section.

Passing to the consideration of the eighteen deaths in the second series, it is found that eight of them had no connection with contracted pelvis, as becomes evident from their mere enumeration:

- No. 5,709, Rheumatic endocarditis
- “ 6,096, 9,046, 9,288, 10,578, Eclampsia
- “ 9,491, Influenzal pneumonia
- “ 12,481, Typhoid fever
- “ 12,905, Late chloroform poisoning

Of the ten deaths remaining, we feel that three certainly and probably a fourth, should not be attributed to the service. Thus, Cases 9,767½ and 10,054 were already infected when admitted, while Case 7,501 had lobar pneumonia and died from a late pneumococcus septicemia. There may, however, be some discussion about the fourth death (7,390). This occurred in a black patient with a 11.5 cm. generally contracted pelvis, who was admitted in labor with a dead child. She had an osteomyelitis of one knee, primary syphilis and a suppurating bubo. Labor was spontaneous and easy and no vaginal examinations were made. Death occurred on the tenth day, and autopsy showed that it was due to streptococcus peritonitis. It appears clear that the fatal outcome was not the result of dystocia, nor of infection originating with us, although its exact mode of production must be regarded as open to question.

On the other hand, we must accept full responsibility for the six deaths remaining. Three of them were due to infection following spontaneous or forceps deliveries. The fourth death (6,730) was due to hemorrhage and shock following rupture of the uterus, which had occurred in the out-patient department. The fifth death (9,422) occurred unexpectedly a few hours after a pubiotomy and was probably the result of shock or of an embolus, but, as an autopsy was not obtainable, its exact cause will never be known. Finally, the last death (8,836) resulted from general peritonitis following an elective cesarean section,

and was due to accidental injury to the intestines which were adherent to the abdominal scar of a previous section.

We feel that the deductions made will bear rigorous criticism, and justify the statement that only six of the eighteen deaths in the second series should be attributed to the service. This constitutes a striking diminution in mortality and indicates that the danger of labor complicated by contracted pelvis was far less in the second than in the first series. The improvement was especially marked in the results following cesarean section, as five deaths occurred in the 26 operations performed in the first series, as compared with a single death in the 221 operations in the second series, a reduction from 19.23 to 0.45 per cent.

In connection with the maternal mortality it is interesting to note that only three of the 29 deaths in both series occurred in white women. As there were 669 white and 2,303 black labors in the two series, it appears that one death occurred to every 223 and 89 labors in the two races, a percentage of 0.45 and 1.12, respectively. This means that the gross mortality was two and a half times greater in the black women. Moreover, the discrepancy becomes even more striking when only the net mortality is considered. In this event it is found that all but one of the deaths occurred in colored women, a percentage of 0.15 and 0.57, respectively. In other words, the net mortality was three and eight-tenths times higher.

How can this difference be explained? We must confess our inability to give a satisfactory answer, but as the patients were treated in the same institution and along the same general lines, it would appear that the solution must be sought in certain conditions peculiar to the negro race. At the first glance, it might be suggested that more colored women enter the service after becoming infected outside, either as the result of imperfect medical attention or of ill judged attempts at delivery; and, if the gross mortality alone were considered, this might be regarded as a plausible explanation. On the other hand, the discrepancy becomes even more striking when the net mortality is considered; but, as in that calculation all such cases had been eliminated, we are forced to seek some other explanation.

Again, it might be argued that more severe degrees of disproportion are encountered in the negro women, so that when a cesarean section is not done on account of an error in prognosis, the patient will be exposed to greater danger of infection and exhaustion. This suggestion, however, scarcely appears tenable when it is recalled that we have already shown that more severe dystocia occurs in white women with simple flat than in black women with generally contracted rachitic pelvises. This being the case, it would seem that the explanation must be sought either in the supposition that the black woman is less resistant to the strain of difficult delivery, or that there is something about her which renders her more liable to infection and more susceptible to it when it develops.

In our judgment, something may be said in favor of each supposition, although it is as yet impossible to adduce satisfactory evidence in favor of either. In order to prove the correctness of the first, extensive statistical studies would be required, which cannot be undertaken at this time. Similarly, although we have recently gained the impression that with identical technic colored patients show a considerably higher incidence of febrile puerperia following normal labor, we are not in a position to suggest an explanation for the clinical observation. For these reasons, we must be content to emphasize the fact that our experience shows that labor complicated by contracted pelvis offers a much more serious prognosis in colored patients, and to defer to the future any attempt to adduce a conclusive explanation as to why it is the case.

Fetal Results.—Table IV gives a summary of the fetal mortality and shows that, while there was an increase in the total number of fetal deaths in the second series, the net mortality due to contracted pelvis had decreased by 37.25 per cent (4 to 2.51 per cent).

TABLE IV
SHOWING GROSS AND NET FETAL MORTALITY

	FIRST SERIES 701 CASES	SECOND SERIES 2,274 CASES
	PER CENT	PER CENT
Total fetal deaths	68, 9.70	286, 12.58
Due to contracted pelvis	35, 4.99	107, 4.71
Less dead on admission	28, 4.00	67, 2.51

NET FETAL MORTALITY

Cases 1-2,000	= 4.73%
“ 2,001-4,500	= 3.38%
“ 4,501-14,000	= 2.51%

The increase in the total number of fetal deaths is probably attributable to the fact that in the first series no cases were considered unless the child weighed 2,000 grams or more, while in the second series all children were included which had reached the period of viability. As a result, we had to deal with more deaths from prematurity, general debility and syphilis in the second than in the first series. Naturally, in computing the net results, it was necessary to deduct all children which were dead at the time the mother was admitted to the Clinic, particularly as a considerable number of patients came to us after having been subjected to attempts at delivery by their own medical attendants. For reasons which will be given when the question of treatment is discussed, we have divided the first series into two subdivisions: namely, those preceding and those following the two thousandth admission. A glance at Table IV shows that a steady decrease has occurred in each of the three periods, the net mortality being 29 per cent less in the second than in the first, and 26 per cent less in the

third than in the second period, which indicates that more extended experience and more rational treatment has led to progressive improvement in the chances for the child.

In the preceding section attention was directed to the differential maternal mortality in the two races, and, accordingly, the question arises as to whether similar differences obtain in the fetal mortality. Upon analyzing our figures such was found not to be the case, the gross fetal mortality being essentially the same in both races, 12.11 per cent in 670 white, and 11.71 per cent in 2,305 black labors. On the other hand, the mortality due directly to contracted pelvis was distinctly greater in the white children, and exceeded by two-fifths that of the colored children (6.73 and 4.12 per cent). Such figures can only mean that more black children succumb to causes unconnected with disproportion, and a little reflection will confirm the correctness of such a conclusion, as we know that syphilis, prematurity and general debility take a much larger toll from them than from the whites. Furthermore, the difference in the size and malleability of the fetal head in the two races would imply that the dangers of disproportion should be less in the black race; whereas, in white patients, any error in determining the degree of disproportion will necessarily be attended by more serious consequences.

Treatment.—During the twenty-eight years covered by this study, the treatment of labor complicated by contracted pelvis has undergone many changes, which in general can be studied most conveniently by dividing out activity into three periods: 1896 to 1905, 1905 to 1910, and 1910 to 1924, which we shall abbreviate as periods, A, B, and C.

A glance at Table V shows that a single operation predominated in each of the three periods and that version and extraction, pubiotomy, and cesarean section, respectively, followed one another as the operation of choice.

TABLE V

SHOWING THE NUMBER OF OPERATIONS FOR CONTRACTED PELVIS IN EACH PERIOD, AND THE PERCENTAGE INCIDENCE OF THE SEVERAL OPERATIONS

	A	B	C*	A	B	C*
				%	%	%
Low and mid forceps	9	8	19	13.63	13.33	5.54
High forceps	10	1	14	15.15	1.67	4.08
Version and extraction	24	15	32	36.36	25.00	9.33
Cesarean sections	15	11	221	22.73	18.33	64.43
Pubiotomy	1	24	12	1.52	40.00	3.50
Destructive	7	1	45	10.61	1.67	13.12
Total	66	60	343	100%	100%	100%

*Not including ten breech extractions or sundry operations.

During the first period, the mortality from cesarean section was still relatively high, and, except in occasional instances, the operation was not resorted to until the patient had been subjected to the test of labor; in other words, we had not yet learned that it gives ideal results only

when performed at the beginning of labor, or better still at an appointed time shortly before its onset. Furthermore, we had not entirely freed ourselves from the belief that prophylactic version was a desirable procedure, and that there was still a considerable field for the employment of high forceps. Consequently, version and extraction, high forceps, and late cesarean section were the operations most commonly employed during that period, with the result that both the fetal and the maternal mortality was relatively high. In general, the first period may be regarded as the premium paid to experience, and it is safe to say that the two most important lessons we learned during it were: first, that when the patient is subjected to a test of the second stage of labor, a spontaneous outcome may occasionally occur under what appear to be most unfavorable conditions; and second, that convalescence after supravaginal hysterectomy is much more satisfactory than after the classical section.

The second period began with the introduction of pubiotomy. Although one of us had the privilege of personally following Pinard's work with symphyseotomy, we could not become enthusiastic about it; while, in the early days of the Clinic, the death of the only patient upon whom it was performed did not serve to increase our enthusiasm. Consequently, when Van der Velde and Doederlein introduced the operation of pubiotomy, we were ready for the innovation; as, in cases of moderate disproportion, it apparently afforded us a means of subjecting the patient to a test of the second stage of labor and at the same time of avoiding the dangers of late cesarean section.

In several publications we gave our experience with pubiotomy, and we slowly learned that, while it gave very satisfactory maternal results, it was attended by so high a fetal mortality as to do away with its advantages. At no time did we regard it as an ideal procedure or as a primary operation, and we always looked upon it as a makeshift device which gave us a chance to save the child when we had miscalculated the degree of disproportion and had allowed the time of election for cesarean section to elapse. Gradually, however, we resorted to it less and less frequently, until finally we limited its employment to a single indication: namely, certain cases of funnel pelvis in young women, in whom it sometimes afforded not only a means of overcoming the existing dystocia, but also of converting the contracted into an essentially normal pelvis. But, even with this restriction, no pubiotomy has been performed in the service since 1920.

While we were going through this experience, we learned even more thoroughly than before to appreciate the wonderfully conservative powers of Nature, as well as how to differentiate with greater certainty between the patients in whom a spontaneous outcome could or could not be expected. Furthermore, we became still more thoroughly impressed with the danger of late cesarean section, unless it were followed by supravaginal amputation of the uterus, which would put an

end to the reproductive career of the patient. It will be noted that during this period high forceps almost completely disappeared as an operative procedure; while version and extraction, either as a means of delivery after pubiotomy or as an independent operation still enjoyed a considerable vogue.

It was during this second period, that we learned that the employment of radical operative procedures in place of the so-called conservative ones not only led to a reduction in the total operative incidence, but also to a considerable lowering of the maternal and fetal mortality. A glance at the table shows that the combined incidence of pubiotomy and cesarean section was only slightly inferior to that of the latter operation in the third series.

This brings us to the last period, 1910 to 1924, and Fig. 3 shows better than words the tendencies which have governed the operative

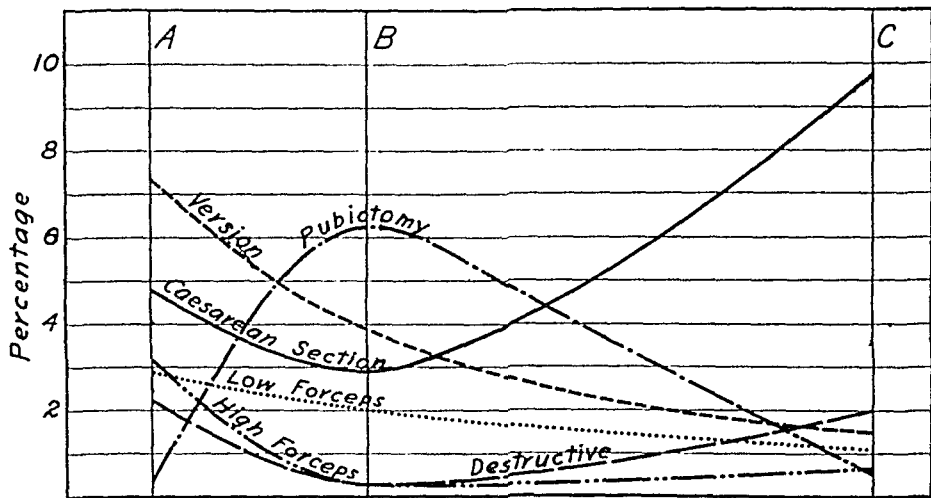


Fig. 3.—Graph showing the variations in operative procedure in each of the three periods.

treatment of pelvic dystocia during the entire twenty-eight years under consideration.

The last period is characterized by two outstanding features: first, the greatest possible extension in the application of prenatal care, and, second, a considerable increase in the employment of cesarean section. The patients are encouraged to register in the prenatal service as early in pregnancy as possible, and to return at monthly and later at biweekly intervals. In this way, no cases of contracted pelvis escape recognition, and as pregnancy advances the development of disproportion and the occurrence of abnormal presentations are detected. Approximately a month before the expected onset of labor, all patients who present any problem, are examined by the head of the department or by his chief assistant, and if necessary return at intervals for further investigation. At these examinations, not only are the pelvic measurements verified, but every effort is made to determine the degree of

disproportion by estimating the size of the fetal head and by ascertaining to what extent it overrides the symphysis pubis.

In this way, it is usually possible to divide the patients into two groups: those in whom the disproportion is so great that our experience leads us to believe that engagement will not occur no matter how efficient the uterine contractions may be, and those in whom it is so moderate that a spontaneous termination of labor can confidently be expected. The former are subjected to classical cesarean section a few days before the calculated date of confinement, with ideal results for both mother and child; while the latter are admitted to the Clinic for observation or are directed to enter it at the onset of labor. In the latter type of case spontaneous birth is the usual outcome, and as time has gone on the proportion of spontaneous deliveries has steadily increased. It must not, however, be understood that we make any claim to omniscience, as we sometimes underestimate the degree of disproportion with the result that the anticipated spontaneous labor does not occur. In such circumstances, the patient is subjected to a fair test of the second stage, and, if it proves ineffectual, she is delivered by what promises to be the most conservative procedure. If the degree of disproportion is moderate, version followed by extraction is still occasionally employed with reasonably satisfactory results; while if the disproportion is more marked, low cervical section is resorted to unless definite signs of intrapartum infection develop, when radical section is performed. Naturally, such treatment is not applicable to the considerable number of patients who are admitted without prenatal care or after having been attended in their homes by their own physicians. In them, classical cesarean section is naturally out of the question, so that if radical operative interference is indicated, the choice lies between low cervical and radical section, or craniotomy if the child is dead or dying.

From what has been said, it is apparent that we believe that the ideal treatment of disproportion by all-wise obstetricians would consist in such ideal prenatal care as to permit the differentiation of all patients into those who will require cesarean section and those who will not, with the performance of classical section before the onset of labor in the former, and with spontaneous delivery in the latter. Unfortunately, such prognostic ability is unattainable, and, if it were, it is safe to say that most of us would find it difficult to live in the same world with those possessing it. Fig. 4, however, shows to what extent we have been able to approximate such an ideal in recent years, and it indicates clearly that in the least and most marked degrees of disproportion theory and practice are in close accord. On the other hand, in the intermediate degrees, the divergence between the curves representing the total operative incidence and the curve for cesarean section gives a good idea of the extent of our failure.

Naturally, the pessimist may object that such teaching is dangerous,

as it is liable to lead to abuse by ignorant or conscienceless practitioners, who may become so liberal in their indications that the two curves must inevitably coincide. We do not believe that even the most captious would venture to suggest such a criticism in our case, for we feel that we have been truly conservative in our indications, as we have been constantly guided by the following considerations: First, we have always contended that the greatest conservatism consistent with the welfare of the patient should be practiced in a teaching clinic; second, we have consistently taught that every operative interference should be regarded as a failure on the part of Nature, and that a much higher

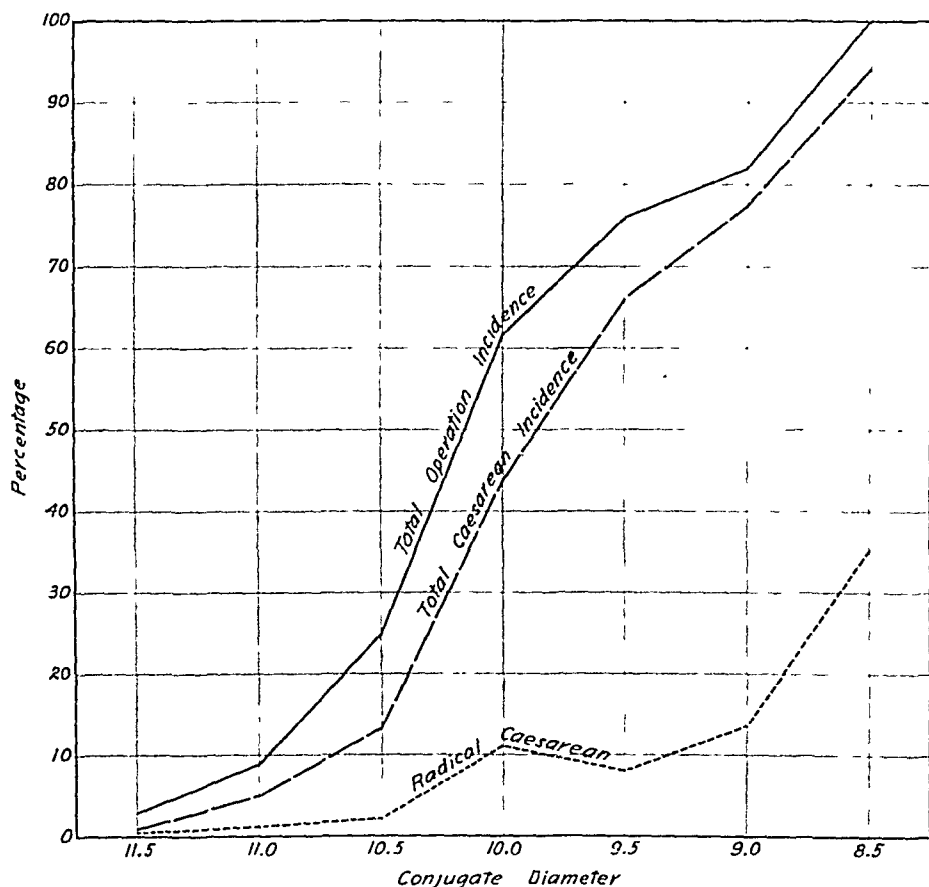


Fig. 4.—Graph showing the total operative incidence and the part played by cesarean section in the third period.

degree of intelligence is required to predict a spontaneous outcome in a borderline pelvis and to see it occur than to perform any operation, no matter how brilliant; third, the performance of 221 sections in the last series of 2,275 labors complicated by contracted pelvis, an incidence of 9.7 per cent, in itself affords conclusive evidence that we have not been unduly radical; and fourth, and finally, from what we know of the operative tendencies throughout the country, we are convinced that few heads of clinics, with so large a contracted pelvis material, would be content to allow anything like so many operative possibilities to escape as we have.

At this point, it would seem permissible to say a few words regarding the several types of cesarean section and our reasons for employing them. Except during the past few years, our choice lay between the classical and radical operation, and as has been pointed out elsewhere, we gradually came to the conclusion that the former when properly performed upon healthy women at an appointed time at the end of pregnancy, or within a few hours after the onset of labor, gives ideal results for both mother and child. Furthermore, the fact that only a single death from infection after elective section occurred in our last series of cases has still further confirmed our opinion. Consequently, we were not tempted to resort to the low cervical section as an elective procedure, and our intuition in this respect has been proved correct by DeLee's admission that such anatomic conditions sometimes follow it that a second operation is attended with considerable difficulty.

A glance at Fig. 4 will show that we have done a relatively large number of radical sections, and we are aware that our practice may expose us to a certain amount of criticism. Our reason for the choice of that operation is twofold. In the first place, it has given us extraordinary results in the presence of suspected or actual infection; the analysis by Harris of 64 such operations performed in our service up to 1922 showed that not a single death had occurred from infection, notwithstanding the fact that many of the patients were admitted in desperate condition. This favorable experience continued throughout the present series, and it was not until September, 1925, that the first patient died from infection following a radical section, and in that instance autopsy showed that its source was an old preexisting broad ligament infection, rather than anything immediately connected with the operation. Consequently, we have gladly embraced every opportunity for performing the radical operation when it appeared indicated, and, while it may be admitted that we have occasionally sacrificed a uterus, we feel that not a few women are alive today who would have perished had any other procedure been chosen. In the second place, we have employed the radical operation as the method of choice for effecting sterilization at a third or fourth section, particularly in colored women. In such circumstances, when we broach the question, we always ask the patient if she wishes to continue to menstruate after the operation, and if she replies in the negative, as most colored women do, we amputate the body of the uterus with a good conscience, with the knowledge that it will effect the desired result, and with the additional assurance that the convalescence will be uncomplicated.

In view of such satisfactory results, we were slow in taking up the low cervical technic. Primarily, it did not appeal to us on general surgical principles, and, notwithstanding the good results reported by many operators following its employment in questionable or actually

infected patients, we were unable to reconcile ourselves to it, until Hofbauer had worked out in our Clinic the peculiar histologic mechanism at the base of the broad ligament which apparently affords an unexpected degree of protection against infection extending directly from the cervix or originating in the pelvic connective tissue. During the past four years, however, we have done a number of cervical sections upon patients who had passed the time of election for the classical operation, and in whom we would previously have resorted to a radical section: and, notwithstanding the fact that certain patients showed signs of definite antepartum infection before interference, the results were unexpectedly good. None of the patients died, but many had a stormy convalescence, and not a few went through a prolonged suppurative process, but eventually recovered. In general, it may be said that the convalescence was more complicated than if a radical operation had been done, but as the patients were eventually discharged alive and with the possibility of further pregnancy, the outcome must be considered satisfactory.

To summarize, it may be said that while we do not share the enthusiasm of many of the advocates for the new operation, it must be admitted that it has a definite place in the treatment of contracted pelvis, and it would seem to be indicated in patients who are seen late in labor, but who are not definitely infected, or in whom the degree of disproportion has been underestimated, and the mistake appreciated so late in labor that we do not dare to resort to the classical operation and yet are unwilling to remove the uterus. Utilized in this way, it will serve to a considerable extent to displace the radical operation, which will come to be reserved almost exclusively for patients with frank antepartum infection, or for those whom we wish to sterilize.

Weight of Children.—In conclusion, we desire to direct attention to certain considerations which have developed from the study of the weight of the children in our two series.

In the first series our deductions were based upon the average weight, whereas, in the second series modal calculations were made. For the latter purpose the number of children were determined which fell into each of the following weight groups:

Less than 2,500 grams
2,500-2,999 “
3,000-3,249 “
3,250-3,499 “
3,500-3,749 “
3,750-3,999 “
4,000-4,499 “
4,500 grams or more

(It should be noted that, in addition to the children born to mothers presenting the more usual types of contracted pelvis, we have considered those occurring in funnel pelvises as well.)

If we set the normal weight of the newborn child at 3,250 grams,

it is found that the number of children which attain or exceed that figure varies greatly in the two races, as well as in the several types of pelvis. This is clearly shown in Table VI, which indicates that practically one-half of the white and two-thirds of the colored children fall below that limit, which makes it readily understandable why so many more spontaneous labors occur in the blacks than in the whites.

TABLE VI
ANALYSIS OF THE WEIGHT OF THE CHILDREN BORN AFTER 1910

	WHITE			BLACK		
	NUMBER	3,250 GR. OR MORE	%	NUMBER	3,250 GR. OR MORE	%
G. C. Typical	258	94	32.6	728	219	30.8
G. C. Funnel	38	9	23.7	204	44	21.5
Simple Flat	135	77	57.1	41	21	51.2
G. C. Rach.	30	14	46.7	749	212	28.3
Flat Rach.	46	20	43.5	15	9	60.
Typical Funnel	230	115	50.	259	90	34.7
Total Number	737	329		1996	595	
	44.64%			29.81%		

The study of these findings, as compared with those obtained from the average weight as in the first series, shows how much deeper an insight into the situation can be obtained by the modal method. For example, upon calculating the average weight of the 701 children in the first series, it was found that the 177 white and 524 colored children presented an average weight of 3,212 and 2,992 grams, respectively. In other words, the former averaged 220 grams heavier than the latter. To most of us this difference of a little less than eight ounces has only a limited significance and in no way prepares us for the fact that less than one-third of the colored children attain to what is usually considered the average weight. Further consideration of Table VI also reveals several additional interesting facts. In the first place, it appears that in every type of abnormal pelvis more heavy children are born to the white than to the black women, the only exception being in cases of flat rachitic pelvis, which occurred so relatively infrequently in the colored race as to make any calculation dubious. In the second place, it is evident that in both races the heaviest children are born to women presenting simple flat pelvises, and the lightest to those with generally contracted funnel pelvises. On the other hand, the typical funnel pelvis appears to be associated with the second heaviest group of children, while in the colored race the children born to mothers presenting generally contracted rachitic pelvises are unusually small.

In other words, it appears that small children are associated with all of the generally contracted types of abnormal pelvis, and relatively large ones with the simple flat and typical funnel varieties. Naturally, it is impossible to explain such variations satisfactorily, but it would

appear plausible to assume that the generally contracted types may be regarded as stigmata of degeneration, and that the imperfect development of the pelvis represents only one of the manifestations of the generally imperfect development which characterizes the entire individual. In this event, it would seem probable that the children would participate in the maternal characteristics, and a certain plausibility is lent to this view by the fact that the smallest children in both races are associated with the generally contracted funnel pelvis; and it would not require a great stretch of imagination to assume that that type of deformity may be regarded as a manifestation of extreme physical degeneracy.

On the other hand, it is a matter of clinical experience that the women with simple flat and funnel pelvises are often large in size, and present no manifest signs of physical degeneration, so that in many instances the abnormality would escape recognition except for routine pelvimetry and the clinical signs of disproportion. For this reason, it would appear that the shortening of the iliac portion of the terminal length of the innominate bone, or the presence of a sixth sacral vertebra, which are the causal factors in the production of the two types of pelvis, respectively, may be regarded as accidental occurrences, which are in no way associated with general physical degeneration, and, consequently, the children born to such women would attain or exceed the usual size and present no stigmata of degeneration.

Whether such theoretic considerations are justified or not, the facts brought out by the modal consideration of our findings are of great interest, and serve to explain in a satisfactory manner why a white woman with a simple flat pelvis may have a relatively difficult labor, as contrasted with the relatively easy one in a colored woman with a generally contracted rachitic pelvis presenting a conjugata vera of identical length.

(For discussion see page 861.)

THE IMPROVED PROPHYLACTIC METHOD OF TREATING ECLAMPSIA, WITH COMMENTS ON THE VARIATIONS SUGGESTED BY WILLIAMS, STANDER, SPEIDEL, AND KING

BY B. STROGANOFF, M.D., LENINGRAD, RUSSIA

THE improved prophylactic method, which for twenty-eight years has been giving the best results, is used at the present time, in its exact form, by very few. Schiller (Germany) and Speidel (U. S. A.) correctly state that this procedure was the first definite plan offered for the conservative treatment of eclampsia in this century. But, notwithstanding the fact that many thousands of cases have been treated successfully by this method and its variations, the incredulous attitude of physicians toward it has not changed, as is proved by the following comments:

1. Zweifel claims that the best results in the treatment of eclampsia are found in the clinic at Leipzig, where the mortality of the mothers is recorded as 8.5 per cent. I showed (*Arch. f. Gynäk.*, cxvi, part 2) that the maternal mortality in our clinic (Petrograd) was 1.4 per cent. It is as though Zweifel were trying to prove that 8.5 is better than 1.4.

2. Prof. Whitridge Williams, in his excellent book, notes our mortality as 10.3 per cent (pp. 620-621, fifth edition), yet on page 626 he asserts that the Dublin method gives equally good results, which is likewise a statement to the effect that 1.7 equals 10.3.*

3. Dr. Speidel writes,—“His (Stroganoff’s) latest statistics are even better and in a considerable number of cases conducted by himself there has been no mortality.” Later on he continues, “The method does not seem to have met with great favor in this country and reports upon its use indicate that the same results have not been duplicated here.” And again, “The Rotunda (Dublin) method offers the best results at present.” Now, as a matter of fact, nobody in the United States, so far as I know, has applied the prophylactic method systematically in a sufficient number of cases; and likewise, no one in Great Britain (outside of Dublin) and in the United States has applied the Dublin method in a sufficient number of cases to obtain reliable statistics for the results of either method. Dr. Speidel himself has used a variation of the Dublin method in eleven cases, and has lost two patients, a mortality of 18.2 per cent.

The above facts are difficult to reconcile. Why is it that a method giving results three to ten times better than the average (1.27-2.6 against 20-25) is accurately applied by almost no one? In King’s

Editor’s Note: It has been found necessary to subject Professor Stroganoff’s article to a considerable degree of correction and revision in order to adapt it to English readers, but it is hoped that changes in the context or the author’s opinions have been avoided.

*This assertion is not in accord with the original reference.

article, there are statistics showing in the Charity Hospital (New Orleans) a maternal mortality from eclampsia of 49 per cent.

My opponents regarded the good results of my first reports as casual. Later they explained the good results in over three hundred cases as due to the mild character of eclampsia in Leningrad. The fallacy of this last argument is proved by the fact that in most of the lying-in hospitals in Leningrad the mortality was much greater than in ours, and in those hospitals where the mortality was small, the treatment was similar to ours. As illustrative of the variable character of eclampsias, Prof. Novoselsky states that 86,759 births of living children were registered in Leningrad during the years 1922-1924, and that during the same period there were 71 deaths from eclampsia, i.e., 1:1222; whereas, in Germany this ratio was 1:2000-3000, and in England and Wales, 1:1385. In Leningrad, at the Inegiereff Lying-In Hospital during the years 1919-1923, the mortality from eclampsia was 16.4 per cent; in the Obutrov Hospital during the years 1919-1923, the mortality was 35.9 per cent; whereas in our institution there was a mortality of only 1.7 to 2.6 per cent.

The reasons the prophylactic method in the hands of others has given less favorable results than in our own seem to have to do almost entirely with the technic of application. The drugs have not been applied in the combinations and over the periods of time demanded by the prophylactic method, nor has the requisite nursing been given. Dr. Rullet, at the meeting of the Society of Obstetricians and Gynecologists, Leningrad, June 11, 1925, stated that after witnessing my application of the prophylactic method, it was clear to him that he had been attempting its use in quite a different manner. However, good results are to be obtained only by exact application of the method, a fact which explains the excellent results obtained in the clinics of Profs. Leopold, Krönig, and Zöpritz. Medical scepticism as to the prophylactic method should yield before two proofs: (1) The treatment of a sufficient number of cases of eclampsia to exclude chance of casual results. (2) The demonstration in the lying-in hospitals of various countries that the prophylactic method results in scarcely any mortality in appropriate cases. The first of these proofs is detailed at some length below; as regards the second, I have had very satisfactory results in all medical establishments in which I have demonstrated my method, but, of course, the number of cases was not so large as was desirable.

I. NOTES ON A SERIES OF THREE HUNDRED CASES OF ECLAMPSIA TREATED WITH THE IMPROVED PROPHYLACTIC METHOD

1. Of 300 patients, 8 died, 2.6 per cent. Of the latter, 4 arrived at the clinic moribund and died in from three to eight hours after admission.

2. Two patients with mild eclampsias, the first of whom had one convulsion, the other, three, died from pneumonia and sepsis. Another patient could not be treated by the prophylactic method because of the lack of chloral hydrate; in addition this patient had had both legs amputated as the result of an accident. In only one of the eight fatal cases was it impossible to control convulsions. During the tenth and eleventh convulsions, this patient had an apoplectic seizure and died. Possibly without this complication, her life might have been saved. Postmortem examination by Prof. Shorre showed a heart permeated with fat, particularly on the right side where the fat reached the trabecular muscles; generalized adiposity, grippal bronchitis, pulmonary hyperemia without edema, multiple hemorrhages and necrosis of liver, chronic perisplenitis, degeneration of kidneys (nephrosis), cysts and hypoplasia of true corpus luteum, normal postpartum uterus, and fresh hemorrhage into the fourth ventricle. To sum up, we had a general mortality of 2.6 per cent and a reduced mortality of 0.3 per cent.

3. In 40.3 per cent of the 300 cases, there was not a single convulsion from the beginning of treatment; in 44.7 per cent there were from one to three seizures, and four or more in 15 per cent.

4. We observed a great number of "intercurrent eclampsias," i.e., cases in which there is freedom from convulsions for twelve hours or more before delivery.

In 1916, before and during labor, we had 27.5 per cent intercurrent eclampsias. Postpartum eclampsias are excluded because they could not be intercurrent. Among eclampsias during labor there were 63.8 per cent that were intercurrent.

5. In five cases, 1.6 per cent, there were psychic disturbances.

6. The mortality among children is relatively favorable, amounting in the whole group to 16.6 per cent. But if prematurely born children (weighing less than 2000 grams) that died from exposure, operations, etc., before treatment was begun, be excluded, the fetal mortality from eclampsia is 6 per cent.

7. There was not a single maternal death due to treatment. It is known that in treatment of eclampsia by forced delivery, approximately 4 per cent of the mothers die as a result of the operation.

8. There was a relatively small number of operative deliveries, 50 per cent. (?)

9. There were a few cases (1.3 per cent) of pneumonia.

10. Rapid recovery of the patients was general.

On the basis of these 300 cases of eclampsia as well as from the analysis of 578 preceding cases treated in our establishment by the less perfect variety of the prophylactic method, I have reached the conclusion that an almost absolutely favorable prognosis can be given for the mothers in cases that have not been neglected.

In 1918 I was able to collect from the literature, which is far from complete, 2208 cases of eclampsia treated by the old method and its variations, with a total maternal mortality of 9.8 per cent. Among 878 children, born of eclamptic mothers whose history is recorded, the mortality after treatment by this method was about 12 per cent less than in cases treated by other methods in the same clinics. A further search of the literature by Prof. Hinselmann revealed 1094 additional cases treated by the old method, up to 1924, which increases the number of cases to 3302, of which 357 (10.8 per cent) terminated fatally.

On the basis of my papers and after studying the literature, Prof. Hinselmann writes: "Ten and eight-tenths per cent and even 2.6 per cent mortality and 60 per cent of cases with repeated convulsions are not satisfactory figures." Our results demonstrate that the first figure can be diminished very considerably but it is more difficult to lower the second. The number of convulsions can undoubtedly be reduced. However, mortality can be diminished only if patients are hospitalized at an earlier period of the disease.

II. DEMONSTRATIONS OF THE PROPHYLACTIC METHOD IN FOREIGN CLINICS

Treatment of cases in foreign clinics has shown excellent results, although the number is unfortunately small. In 7 cases of eclampsia which I treated in Heidelberg, Vienna, Berlin, and Austria, all patients recovered. Of these, 4 did not have a single convulsion after beginning the treatment. The fifth had one, the sixth two before delivery, with a relapse of one during labor after sixty-three hours, and with one more fit nineteen hours after delivery. Only one patient had six fits. Thus, in 57 per cent the convulsions stopped immediately after beginning the treatment, in 28.7 per cent they were observed once or twice, and in 14.3 per cent there were more than three fits. These figures would have been of no value had they not coincided with, or more properly speaking, exceeded the results obtained in Leningrad in hundreds of cases, which have previously been published.

A more convincing experiment was that of treating eclampsias in different hospitals of Leningrad, partly by personal attendance and partly by telephone consultation. Since March, 1925, I have been called in consultation on 21 cases of eclampsia in Prof. Snegiereff's hospital. All of these patients recovered, and most of them had no fits after the beginning of my treatment. Only one patient, in whom the treatment was incorrectly carried out, had a severe course (16 fits). When this 100 per cent of recoveries is compared to the former death of one in every six cases of eclampsia in this hospital, the experiment must be considered successful. Four other cases were treated successfully in other hospitals, making a total of 25 patients. Formerly I had often used the telephone for consultation treatments

very successfully in Prof. Krassowsky's Lying-In Hospital. The patients were generally in charge of midwives, and I visited them only once a day. In many of 137 eclamptics during twenty-four years I gave my instructions partly by telephone, and in mild cases I saw the patient for the first time on the following day. This telephone consultation has the advantage of preventing delay in application of the method, which is especially desirable in view of the high mortality of eclampsia.

In the Cologne (Germany) clinic the statistics of mortality (1875-1920) are 128 (22.9 per cent) maternal deaths out of 558 cases of eclampsia, and 34 per cent fetal deaths. In England, the maternal mortality is 22.5 per cent; in the Royal Maternity and Women's Hospital of Glasgow, during 1913-1922, 183 fatalities occurred in 813 cases of eclampsia (22.4 per cent) and 60 per cent of the children died. In the United States, King gives a maternal mortality of about 49 per cent; Rice, about 46 per cent; and Williams, of about 21.7 per cent in exclusively postpartum eclampsia, which in my opinion are the mildest cases.

Mortality from eclampsia and albuminuria in relation to delivery is next if not equal to that from sepsis. I have tried here to set up a standard of possible attainment through the use of the improved prophylactic method, and assert that its different variations have the effect merely of decreasing its value. It is in this connection that I would like to discuss the articles of King, Stander, and Speidel.

Speidel is correct in stating that better results are obtained in eclampsia by conservative than by surgical treatment, in maintaining that the treatment of eclampsia today is in rather a chaotic condition, and that annual publication of methods and results of their use is highly desirable. Unfortunately, while acknowledging the great value of the prophylactic method, Speidel does not arrive at the conclusion that the test of the method is indispensable, but proposes instead his own variation of conservative treatment. We are ready to agree with him that our principal task should be to control the convulsions. But he is scarcely right in denying the use of chloroform on the grounds that it causes the same changes in the liver as the toxemia of pregnancy. If our main task is to control the convulsions, chloroform is the best means. It paralyzes the vasomotor nerves, diminishes the blood pressure and calms the patient. It is to be administered in slightly concentrated form and in small quantities, 3 to 4, seldom 10 gm. or more at a time. We make it a rule to treat the patient in a gentle manner; we scarcely touch her at all. Inhalation of 25 to 50 gm. of chloroform during a period of from five to twenty hours, with a free admixture of air, is not likely to cause poisoning, my belief being based on experience with 878 cases.

Dr. Speidel is correct in recommending the use of oxygen immedi-

ately after the paroxysm. Asphyxia is a kind of toxemia and should be overcome as quickly and completely as possible. In describing the prophylactic method, Dr. Speidel states that I give narcotics "until the fits are controlled." This is not quite so, and this is a very important point in which my method differs from others. I give narcotics not until the convulsions are controlled, but until there no longer exist symptoms of an impending fit. As a rule, I recommend narcotics in mild cases of eclampsia postpartum, until at least twelve hours after the time of the last convulsion. In cases of eclampsia during or before labor the time must be prolonged to twenty-four hours. If symptoms of an impending attack are seen on the second day, treatment is to be continued (1 to 1.5 gm. of chloral hydrate, three times daily). Light in the patient's room should be enough only for the nurse's attendance. Sleep is necessary. Bowel lavage is to be applied only in cases signally demanding it. Eclamptic patients rarely require stomach lavage, as they are not inclined to overeat, because of premonitory symptoms. Further, stomach lavage is not free from danger; Prof. Lichtenstein describes two fatal cases. Saline injections are dangerous on account of a nephritis; injections of glucose solution are also (perhaps a little less) dangerous. Venesection (about 700 c.c.) not only lowers blood pressure and removes toxins but favorably affects the heart and pulmonary circulation.

Dr. Speidel recommends placing the patient on her left side; I prefer the right side, in order to avoid extra pressure on the heart. It is highly desirable to change the posture of the patient in bed four to six times daily to avoid hypostatic pneumonia. I protest most emphatically against failure to use narcotics in comatose patients, for, although not conscious, they undoubtedly preserve an unconscious sensibility.

In regard to the criticism of the improved prophylactic method, Dr. Stander indicates that 10.5 to 15 gm. of chloroform is to be considered as a maximum dose. As a matter of fact, we generally use 3 or 4 gm. In London, for instance, I used 28 gm. of chloroform in twenty-four hours' time, but in this case I was obliged to give narcotics in larger quantities than in Russia, because of the greater noise from the street. Dr. Stander includes among the cases of eclampsia observed during 1914-1924, one patient that died apparently of apoplexy and sepsis. I do not consider this case as one of eclampsia, as there were no convulsions, and I do not recommend my method for such cases. I may remark parenthetically, that I have never seen a case of eclampsia without convulsions, and I do not know how such cases should be treated. I have regarded the above case from the autopsy findings as one of cerebral hemorrhage. Dr. Stander makes the curious affirmation that he found among our patients many cases

of nephritis. Now it is possible that among many hundreds of cases in our clinics there might be an occasional mistaken diagnosis, but Dr. Stander's statement of many cases of nephritis can hardly stand against the diagnoses made by many obstetricians after the most careful analysis of each case. Furthermore, has Dr. Stander seen in his own clinic many cases of nephritis with only one uremic convulsion? For if our patients were, as he implies, nephritics, rather than true eclamptics, then the prophylactic method would have the added virtue of controlling uremic convulsions. As a matter of fact, this method has been observed to be of value in cases of uremic convulsions and in cases of status epilepticus. In regard to the mild type of our eclampsias, this is generally a natural consequence of the efficiency of treatment.

As for Stander's method of treatment, the following criticisms may be made: (1) It includes only a minimum dose of medicaments, whereas it is better to vary the dose in accordance with the severity of the case and the patient's strength. (2) Injection of 500 c.c. of a 5 per cent solution of glucose, as stated above, is more dangerous than useful, since it causes rise of blood pressure and unnecessary irritation. Our experience has shown this procedure to be perfectly useless. (3) In severe cases of eclampsia, bloodletting is so useful that it must be retained. (4) Keeping patients warm and slightly perspiring must also not be neglected.

Finally, in regard to Dr. King's variation of conservative treatment: (1) The injection of 0.03 gm. of morphia as the initial dose may be useful to the mother but can scarcely be of use to the child. (2) Bloodletting of 500 to 800 c.c. may perhaps be effective in the case of strong American women, but it seems excessive for European women, particularly as smaller quantities are equally effective. (3) Introduction of 4 gm. of chloral hydrate at one time seems to be a large dose, although I am inclined to increase the first dose to 2.5 gm. The weak point of this variation is in the absence of care to prevent the fits, a lack which brings back the old method, which has proved ineffective. Dr. King is against the induction of labor during the convulsions, although in the examples he cites, he very often breaks the rule. For the induction of labor, we generally rupture the membranes, after which, ordinarily, labor soon begins because the uterus is in a state of increased irritability. Out of six cases of eclampsia treated by Dr. King, one died, i.e., a 16.6 per cent mortality.

On the basis of theoretic analysis, as well as from the consideration of the facts, it appears that these three variations of the conservative treatment of eclampsia can scarcely give better results than the improved prophylactic method, which can be advantageously applied to patients both in lying-in hospitals and at home.

REFERENCES

- Eden, T.: Jour. Obst. and Gynec. Brit. Emp., 1922, No. 3.
 Hinselmann: Die Eklampsie, Bonn, 1924.
 Kapferer: Inaug. Diss., Freiburg, 1911.
 King, E. L.: AM. JOUR. OBST. AND GYNEC., March, 1925, ix, 339.
 Roth: Arch. f. Gynaek., xxxi.
 Schiller: Monatschr. f. Geburtsh. u. Gynäk., February, 1914.
 Speidel, Edward: AM. JOUR. OBST. AND GYNEC., March, 1925, ix, 324.
 Stander, H. T.: AM. JOUR. OBST. AND GYNEC., March, 1925.
 Williams: Textbook of Obstetrics, New York, ed. 5, D. Appleton and Co., 1907.
 Zöpritz: München med. Wchnschr., 1912, No. 8.
-

GLUCOSE AND INSULIN IN THE TOXEMIAS OF PREGNANCY*

BY C. JEFF MILLER, M.D., F.A.C.S., NEW ORLEANS, LA.

ECLAMPSIA and the various other toxemias of pregnancy must still be characterized as diseases of theory for the reason that in spite of intensive work done along various lines their origin is as yet entirely unknown. Recent investigations have tended to support the belief that there is some common factor underlying those arising in early pregnancy, as pernicious vomiting, and those of the later months, as preeclamptic toxemia and eclampsia, but as yet no definite proof has been adduced to establish this contention. The condition has been variously attributed to fetal and placental toxins, to glandular disturbances, to autointoxication, or to malfunction of the maternal liver, although there are authorities who claim that this hepatic malfunction, like the acidosis which almost invariably accompanies such toxemias, is a result and not a cause. The laboratory investigations of the last few years, however, plus the brilliant results obtained through the administration of glucose in the various toxemias, and, more recently, glucose combined with insulin, suggest more firmly than ever that some metabolic disturbance is at the root of the trouble and that the factor most largely concerned is the carbohydrate balance.

Postmortem findings have shown that fatty necrosis of the liver is almost constant in fatal cases of toxemia and clinically it would appear that the metabolic factor at fault is a temporary lack of glycogen. Theoretically, then, it would seem that this condition, together with the acetonuria which usually accompanies it, could be obviated by an abundant supply of carbohydrates, and Titus and his coworkers have practically proved this through postmortem photomicrographs, which show that the livers of those patients who have died of eclampsia following treatment by glucose lack the definite fatty necrosis and periportal hemorrhages supposed to be an invariable sign of the disease. It is certainly logical to suppose, since the liver is known to have greater powers of regeneration than any other

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, January 14, 1926.

organ in the body, that if the pathology has not become too grave, the liberal administration of carbohydrates in the form of easily assimilable glucose would effectively check the toxemic process, particularly if the utilization of the glucose were hastened by the addition of insulin. If the process has been allowed to become too grave, naturally the liver will have lost its powers of regeneration and cannot absorb the glucose which it needs even more than the normal organ.

There are various theories to account for this liver involvement, perhaps the most reasonable of which is Slemmons' contention that the fetus and placenta require large amounts of glycogen, which will naturally be secured from the maternal liver, as the glycogen storehouse of the body. If a diet rich in carbohydrates is supplied this demand can be met; if not, the liver supply will be exhausted, fatty replacement with degenerative changes will occur, the liver function will be impaired, and the system will shortly be flooded with toxins.

The acidosis which is so prominent a factor in the last stages of pernicious vomiting is not only a result of the stomach's intolerance of food, but tends to increase that intolerance and so to prolong the nausea and vomiting. A vicious cycle is thus set up which can only be broken by checking the vomiting, usually by abortion, or by ending the acidosis, which the administration of glucose and insulin does admirably. It might be pointed out here that if this theory is correct, our present habit of restricting the diet of toxemic patients is radically wrong; we are adding starvation with its resulting acidosis to the already complex toxic picture, and food is not only indicated but demanded.

Certain other laboratory studies are of interest. Williamson, for instance, has recently shown that there is throughout pregnancy a slight but very definite reduction of the blood alkali reserve and that in some cases this reduction reaches dangerous limits. Other investigations have shown that there is also a reduction of the tension of the carbon dioxide of the alveolar air. Thalhimer, whose work throughout has been most valuable, suggests further fields for biochemical investigation, basing his inquiries upon these facts already proved. "Might these data indicate that there is in pregnancy a fundamental change in carbohydrate metabolism, and not merely a carbohydrate deficiency? Does the glycosuria in pregnancy following a small dose of phloridzin also indicate a change in carbohydrate metabolism, or only an increased permeability of the kidneys to glucose? Since excessive vomiting of pregnancy is a disease of early pregnancy, is the carbohydrate metabolism deranged until the beginning of the development of the fetal pancreas?" It may be that out of the solution of such problems as these will come the solution of the vexing problem of the origin of the toxemias of pregnancy, but it is obvious that this happy result will be achieved only by the combined efforts of the

clinician and the laboratory worker, particularly the physiologist and the biochemist.

In spite of the fact, however, that the origin of the toxemias of pregnancy is still an unsolved problem, it is clearly evident that in glucose, particularly when combined with insulin, we have added a very valuable therapeutic agent to our obstetric armamentarium. It is true that we do not as yet know just what their action is in causing the disappearance of the ketone bodies, nor, for that matter, do we know the exact mechanism of the insulin reaction alone. The theory that it is associated exclusively with the internal secretions of the pancreas has been proved untenable by the discovery of the substance in various body tissues and even in the tissues of individuals who have died of diabetes. No matter, however, what the nature of the reaction, the fact remains that glucose and insulin in combination will apparently check nearly all the toxemias of pregnancy in their early stages and will markedly benefit many in the later stages.

Perhaps the method may be set down at present as empirical. I am aware that some authorities object to the stand taken by Thalhimer and his followers on the ground that a deficiency of blood sugar has not yet been demonstrated by a single observer, and that therefore the introduction of more sugar is illogical if not actually dangerous. Certainly, if the method is to be carried to its logical conclusion, there should be careful estimations of the blood sugar, of the liver sufficiency, and of the blood alkali reserve in large series of cases by competent observers. In view of the results already achieved from the method in its so-called empirical stage, it is not too much to hope that later, as a result of its continued use and investigation, we may expect to achieve the establishment of certain definite standards which will enable us to determine, for instance, when a pregnancy must be terminated or when it may safely be allowed to continue, points which, at present, must be decided from the patient's general condition, an obviously treacherous guide upon which to base our procedure.

For the last five years I have been using glucose in the treatment of the toxemias of pregnancy and for the last several months I have been using it in connection with insulin. The success of the method has induced me, more than any other one thing, to rely upon conservative measures in handling such cases. Routine measures are naturally employed also, but to my mind it is the glucose and insulin which turns the trick. The proper administration of the glucose is of the utmost importance. Proctoclysis is unreliable; hypodermoclysis, while better, is not entirely satisfactory, and the ideal method is intravenous infusion. We have been using a 5 per cent solution in the ordinary case, and giving one unit of insulin for every 3 gm. of glucose until 10 to 15 units have been given altogether. Moreover, we have found it

safe to repeat the procedure as indicated. The insulin, of course, is given by needle.

While I have made no detailed study of my records, I may safely say that in the last five years at least 40 cases of toxemia and 20 of eclampsia have been treated by our individual modification of the Stroganoff method, combined with glucose, with excellent results. Lately, we have added insulin to the method, and the results have been even more brilliant. The number of cases, of course, is still too small to warrant dogmatic conclusions, but certainly the results have been striking enough to warrant consideration, and, because of these results, and because of the fact that the method is based upon careful biochemical investigations the outcome of which has been generally accepted, it would seem that the treatment is worthy of systematic adoption in an obstetric service.

REFERENCES

- Duncan and Harding: Can. Med. Assn. Jour., 1918, vii, 1057.
 Harding: Lancet, 1921, cci, 327.
 Thalhimer, William: Jour. Am. Med. Assn., 1924, lxxxii, 696-699. Surg. Gynec. and Obst., 1924, xxxix, 237-239. Jour. Am. Med. Assn., 1923, lxxxi, 383-385. Jour. Am. Med. Assn., 1922, lxxviii, 190-191. AM. JOUR. OBST. AND GYNEC., May, 1925, ix, 673-677.
 Titus, Pau.: AM. JOUR. OBST. AND GYNEC., February, 1922, iii, 209. AM. JOUR. OBST. AND GYNEC., May, 1922, iii, 559.
 Titus, Paul, and Givens, M. H.: Jour. Am. Med. Assn., 1922, lxxviii, 92-98.
 Titus, Paul, Hoffmann, George L., and Givens, M. H.: Jour. Am. Med. Assn., 1920, lxxiv, 777-783.
 Williamson, A. C.: AM. JOUR. OBST. AND GYNEC., 1923, vi, 263.

512 HIBERNIA BUILDING.

(For discussion see page 865.)

PHOCOMELUS WITH CONGENITAL CYSTIC ELEPHANTIASIS

BY H. A. HARRIS, M.B., B.S., ST. LOUIS, MO.

(From the Institute of Anatomy, University College, London, and Washington University, Saint Louis)

ROKITANSKY¹ with commendable brevity defines phocomelus as a "monstrosity with phocal (seal-like) extremities, the hands issuing from the shoulders, the feet from the pelvis, while the intervening parts are either wanting or merely rudimental. It is an arrest of development often dependent upon hydrocephalus or spina bifida." The monster herein described was born of a single woman. She gave a history of five months' amenorrhea and complained of bleeding from the uterus for four days. On examination the uterus was of the size of a pregnancy of three and a half months. A monster was expelled within a few hours, and the fully formed placenta showed no gross abnormality. There was no history of dropsy in the mother.

The external form of the fetus immediately suggested that it was a case of phocomelus combined with cystic elephantiasis. The fetus had the form of an ovoid sac, 11 cm. long by 7 cm. wide (Fig. 1); the skin was macerated and only a small area of skin over the frontal area showed the pattern of lanugo. The head was large and occupied almost one-half of the total length. The eyes were open so that the greater portion of the lens was visible between the straight margin of the upper lid and the semicircular margin of the lower lid. The frontonasal process extended downwards between the eyes and presented in its upper portion a broad nose with two open nostrils set well apart; in its lower portion the process terminated as a broad process comparable to that which is seen in certain cases of double harelip. The mouth was represented by a Y-shaped slit, and there was no trace of a chin below. The short lateral limbs of the "Y" extended between the frontonasal process and the right and left maxillary processes; the vertical limb extended below the frontonasal process and separated the two maxillary processes. Below the outer canthus of the left eye at a distance of 3 mm. was a small pit-like depression which showed a small blind canal 1 mm. in diameter and 2 mm. deep. There is a small depression in the skin of the right side, somewhat more laterally placed, but there is no blind canal. The right and left ears are absent, and it is suggested that these depressions mark the site of the external auditory meatus. Two small elevations lie on either side of the vertical limb of the Y-shaped mouth, but no suggestion can be made as to their significance. There is no bone or cartilage therein.

The umbilical cord is dilated for 2 cm. in its proximal part, and is deeply stained with bile pigment from the contained loop of intestine. The cord contains two hypogastric arteries and one umbilical vein. The limbs are represented by flipper-like hands and feet arising directly from the trunk. The hands arise from the antero-lateral aspect of the trunk about 7 cm. from the vertex; the right hand occupies the normal embryonic position with the large thumb preaxially placed, and the second, third and fourth digits are completely fused. All the digits have well-formed nails. The feet are placed terminally so that the soles look anteriorly and the little toes

touch one another in the middle line. The great toe is widely separated from the other four toes which are partly fused; the nails are well formed. Near the posterior extremity of the trunk on the ventral extremity is a small genital tubercle about 2 mm. long and 0.5 mm. in diameter with a small anus immediately posterior thereto. There is no trace of a scrotum or median raphe.

The radiogram (Fig. 2) shows a markedly abnormal vertebral column consisting of a double chain of about twenty paired centers of ossification which are partly fused. There is no resemblance to the orderly arrangement, in three columns of centers and lateral masses, which is seen in the normal. There is no trace of a skeleton in the upper limb girdle but the humerus appears as a roughly cylindrical piece of bone about 7 mm. long and 1 to 2 mm. in diameter. The hand displays a number of



Fig. 1.—Anterior aspect of fetus after considerable shrinkage in alcohol.

centers of ossification which do not admit of ready reconstruction in terms of metacarpals and phalanges. The bony radius and ulna are absent. The lower limb girdle and femur are absent, but there is a pair of bones in the hind end of the fetus which may represent the left and right tibiae. Each bone is about 7 mm. long by 1 mm. in diameter. There is no trace of a second bone. The bones of the feet display an arrangement which is almost as irregular as the hands. The fact that both the metacarpals and metatarsals together with all three phalanges in some of the digits are ossified indicates that the age of the specimen is well over one hundred days.

The skull is expanded and occupies one-half of the total length of the fetus. The radiogram shows a large center of ossification for the body of the sphenoid in the

midline. This center is about 2 mm. long by 3 mm. wide. On either side are paired centers for the small wings and, extending more laterally, are the centers for the large wings of the sphenoid. The two frontal bones are ossified and the supraorbital ridges are very distinct. The supraoccipital is ossified and the two centers which lie lateral to the lateral extremities of the great wings of the sphenoid on the radiogram are the centers for the superior maxillae; there are also two small spurs of bone in the tip of the frontonasal process and they appear to represent the premaxillae. The remainder of the cartilaginous base of the skull has failed to ossify.

The skin on the back of the fetus was incised in the midline and there appeared a series of cysts in the subcutaneous tissues. The cysts varied in size and contained



Fig. 2.—Radiogram of the Phocomelus.

clear fluid and a certain amount of curd-like material. A large cyst spread over the vertex and some of the dorsal cysts spread around the trunk and communicated with cysts on the anterior abdominal wall. The walls of the cysts were smooth and shiny with occasional patches to which were attached flakes of lymph; section showed them to resemble microscopically the condition seen in a typical lymphangioma or cystic hygroma.

The umbilical hernia contained 4 cm. of intestine distended by meconium (Fig. 3). The walls were friable and deeply stained with pigment. There was some plastic lymph adherent to the intestine, so suggesting that the herniated gut had become strangulated. The returning loop of small intestine left the sac and after a course

of 5 mm. joined the cecum, which, with the appendix, lay to the left of the midline (Fig. 4). There was no trace of a Meckel's diverticulum, and nothing abnormal was noted in the liver and biliary apparatus. The stomach was small and empty, the anterior and posterior walls being in contact; the spleen and diaphragm were normal. The kidneys, suprarenals, ureters and bladder were normal in position, but the kidneys showed no trace of that lobulation which is normal to a fetus of this age. The testicles are situated at the internal abdominal rings, the head of the epididymis resting on the lateral and cranial aspect of the testicle. The left testicle is shown to the left of the appendix (Fig. 4). Whereas the suprarenal arteries arise from the abdominal aorta just before its bifurcation, the renal arteries arise from the anterior aspect of the umbilical arteries 6 mm. beyond their origin. There are no accessory renal arteries.

On opening the thorax in the middle line it is seen that there is no trace of a bony or cartilaginous skeleton, neither ribs nor sternum. The heart lies entirely to the left of the midline and there is no trace of the left lung or pleural sac; the

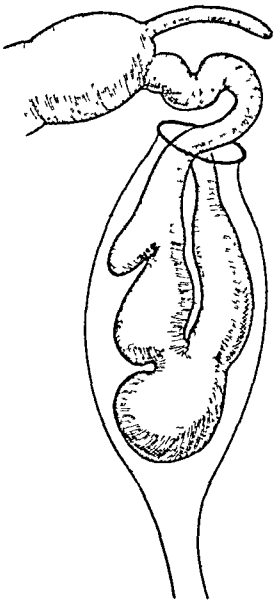


Fig. 3.—Umbilical hernia.

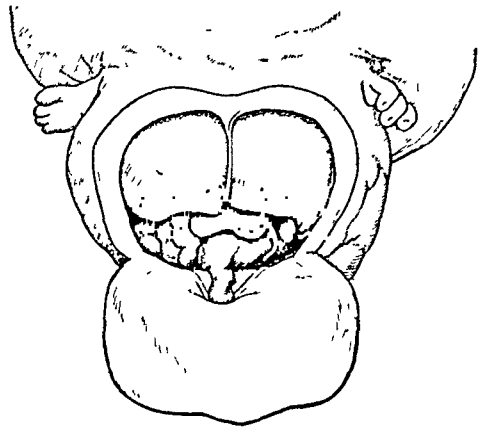


Fig. 4.—The abdominal contents with testicle to left of left-sided appendix.

right lung and pleural sac is normal except for its encroachment on the midline. The heart displays a bifid apex and the interventricular groove is placed so that the area of the left ventricle visible from the front is as extensive as the area of the right ventricle. The right and left auricular appendages meet on the anterior aspect of the single pulmonary aortic trunk which arises from the cranial border of the ventricles so as to be more closely associated with the right ventricle than the left (Fig. 6). The aortic arch is right-sided and gives off in turn the left innominate, the right common carotid, and right subclavian arteries. The right pulmonary artery arises at the convexity of the arch and passes in front of the descending aorta to the right lung. There is no trace of a left lung or left pulmonary artery. The common pulmonary aortic trunk presents a right and left sinus of Valsalva, with openings for the two coronary arteries and there are three semilunar valves arranged as posterior and right and left lateral. The interventricular septum lies in the sagittal plane and has a free fleshy margin which does not extend up into the pulmonary aortic trunk, but reaches to within 4 mm. of the semilunar valves. The auricular septum was widely deficient.

The Y-shaped mouth was seen to be quite separate from the nose, the choanae being completely stenosed. The nostrils opened into two lateral nasal cavities which were separated by a distinct cartilaginous septum. The lateral walls of the nose showed faint ridges corresponding to the primitive folds of the inferior conchae. There was no communication between the nose and the mouth or pharynx. The roof of the mouth presented two small elliptical anteroposterior depressions on either side of a median ridge which reached down towards the floor of the mouth for a distance of 3 mm. and extended posteriorly for a distance of 6 mm. Lateral to these depressions on either side was a ridge which represented the incomplete secondary palatal processes. The floor of the mouth had no obvious tongue or lower jaw. On section in the midline, however (Fig. 5), a rudimentary tongue and epiglottis were seen, and notwithstanding the absence of any cartilaginous or bony trace of the mandible yet there was a distinct cartilaginous hyoid and thyroid cartilage; the cricoid was not present but the trachea showed the normal arrangement of cartilaginous rings. The trachea led to a single right bronchus, and there was no trace of a

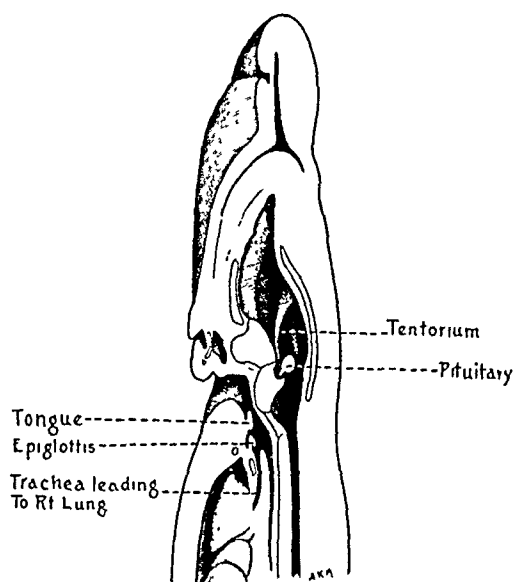


Fig. 5.—Median section of fetus, showing absence of the choanae, rudimentary tongue and epiglottis; and the pituitary gland in situ.

depression or diverticulum to suggest the left bronchus. Dorsal to the trachea was the esophagus which narrowed rapidly at the level of the right bronchus. The diameter of the gut beyond this point was less than 0.5 mm. and only a very fine probe could be passed. The distal 5 mm. of the esophagus was of normal caliber and led into the small stomach.

The specimen was sectioned in the midline from vertex to rump and the cranial cavity and spinal canal were found to contain a greyish mass of coagulum and disorganized nerve tissue. The meninges, especially the dura, were recognized and the cranial nerves and many of the spinal nerves could be distinguished although their diameter was much reduced. All the cranial nerves were identified and about twelve pairs of the spinal nerves could be recognized in the proximal part of their course. The section of the skull confirmed the interpretation of the radiogram and the pituitary gland was situated on the flattened sella turcica in relation to the ossified body of the sphenoid. The well-developed tentorial fold attached to the free border of the petrous bone served as a landmark (Fig. 5), and aided in the recognition of the foramina of exit of the spinal nerves.

ANATOMIC CONSIDERATIONS

The attempt to associate any particular form of malformation of the fetus with a definite period of time in the antenatal cycle is still without definite result. The theory of the special nociceptivity of the fast growing tissues, whereby the stress of an injurious stimulant falls upon that tissue or tissues which at that moment is undergoing most rapid differentiation and growth, has indicated a line of research which is of some value. The more recent attempt to associate each deformity with a particular interference with the processes of oxidation in the embryonic tissues may give more productive results when more is known of the normal and pathologic placenta and of the nutrition of the fetus.

(A) *The Skeletal System.*—As regards the skeletal deformities in this case, the absence of the clavicle and mandible,—the first two bones to appear in membrane,—is suggestive; especially as it is associated with the absence of the ribs and lateral masses of the vertebrae, which appear soon after. This suggests that during the thirty-ninth to the forty-fifth day the embryo was the victim of unfavorable conditions. On the other hand, the presence of an ossified humerus, and of well-marked frontals makes it hard to adopt this explanation, unless the particular instant of onset of bony deposition is subject to a very high degree of timing. Moreover, the absence of the radius, ulna, and fibula is difficult to interpret on this score. It is possible that with an underlying dilatation of the neural canal the extent of deformity may be determined by the distance of a given structure from the central axis so that whereas the ossification of the hand and foot has proceeded to some extent after normal fashion that of the more proximally placed pelvic girdle, shoulder girdle, and vertebral column has suffered more severely, by reason of the pressure from the dilated neural canal.

The radiogram (Fig. 2) shows that the lateral masses of the vertebra have failed in the whole extent of the column. In the normal embryo² the center for the lateral masses first appear in the upper cervical region and gradually extend from above downward. These for the centra appear in the lower dorsal region and extend cranially and caudally; the first centra of the lower dorsal region appear at a time when the centra for the lateral masses have extended to the lower lumbar region. It appears then that in the particular embryo concerned the centers for the lateral masses failed to appear in the cervical region at the same time, or possibly for the same reason which interfered with the appearance of the ribs, clavicle, and mandible. The irregularities of the centers for the centra of the vertebra, consisting of duplication in a given segment and fusion in the main axis may be attributable to the general dilation of the central canal and so falls into series with the irregularities of the limb girdles and limbs.

(B) *The Circulatory System.*—The outstanding anomaly of the circulatory system (Fig. 6) of this case is the defect of the aortic system, with persistence of the truncus arteriosus. The common trunk is more closely related to the right ventricle and rides above the free margin of the defective ventricular septum in such a way that blood from the right ventricle passes directly into the common trunk, whereas blood from the left ventricle passes to the common trunk by way of the defect in the base of the ventricular septum. This common trunk has three semilunar cusps and two normal coronary arteries arising behind two of these. At first sight it seems improbable that a persistent aortic trunk should possess three cusps, in view of the usual account of the formation of the cusps of the aortic and pulmonary valves. It is interesting to note that the case of persistent aortic trunk described by Dr. Maud Abbott³ also had three cusps, whereas the case described by Preitz⁴ had four cusps. In thirteen cases of this condition collected by Dr. Abbott, twelve were associated

with defect of the ventricular septum, six with defect of the auricular septum, eight with right-sided aortic arch, and in two cases there were associated anomalies of the vessels or other systems.

In this case there is not only a defect of the septum of the ventricle, but there is also the absence of the left lung and left pulmonary artery. Normally, the truncus arteriosus is divided into the two great efferent vessels by a septum which is derived from three distinct parts; viz., the distal and proximal endocardial bulbar swellings and the aortopulmonary septum proper, which appears in the lumen of the trunk at

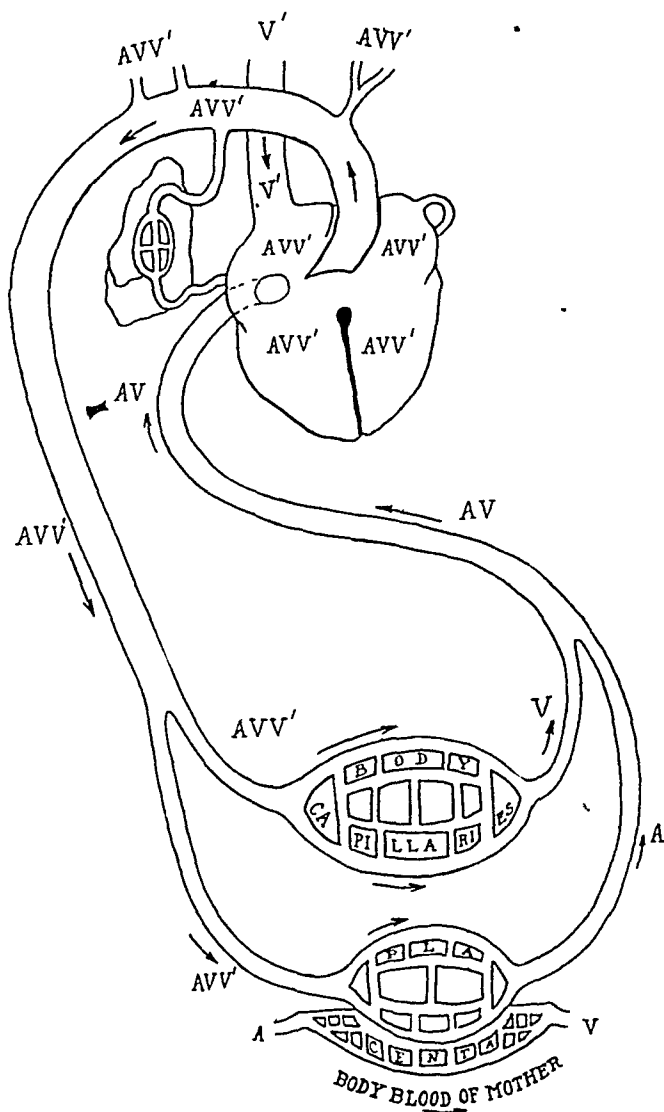


Fig. 6. Schema of the circulation of the Phocomelus fetus.

the point of junction of the fourth and sixth arches. The presence of a fourth and sixth right arch in the specimen is difficult to account for since the fourth and sixth left arches together with the aortopulmonary septum are absent. In a previous case of absence of the left lung there was no trace of a left pulmonary artery, although there was present a right aortic arch (fourth) and an abnormal left aortic arch which was probably the sixth. Bremer⁶ has shown that the right pulmonary arch in man is made up of two elements, the sixth arch and the pulmonary outgrowth, whereas on the left side the pulmonary consists of the outgrowth only, the corre-

sponding proximal portion of its sixth arch having been assimilated in the pulmonary trunk. It is possible that the left pulmonary arterial outgrowth appears later than the right, in accordance with the appearance of the left lung anlage at a later date than the right, as described by Blisnianskaja.⁷ Ilis⁸ shows a 4 mm. embryo in which the paired diverticula of the pulmonary anlage lie immediately above the auricle of the heart. The 5 mm. embryo of Ilis shows the diverticula growing dorsally and passing downwards so as to pass beneath the ducts of Cuvier. At this time the mandibular arch is in contact with the heart, whereas the frontonasal processes and small maxillary processes are not in contact with the heart. There is a temptation

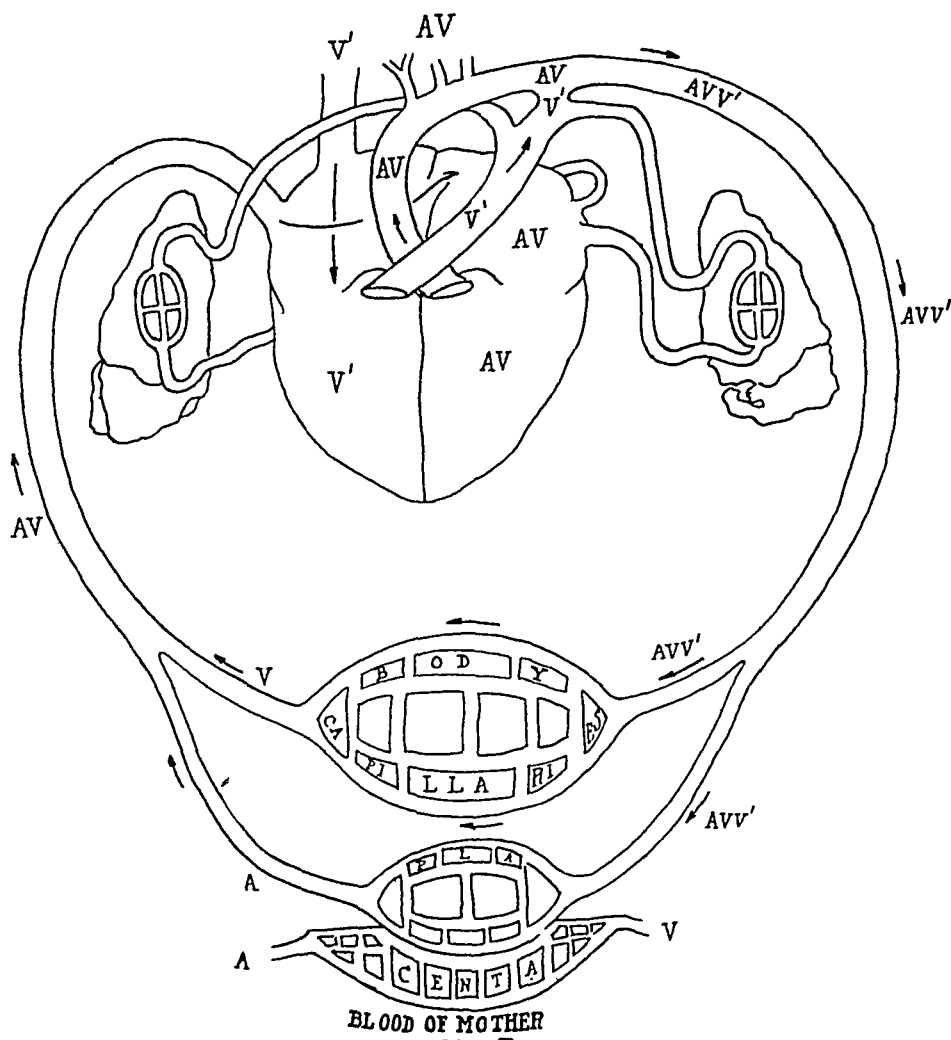


Fig. 7.—Schema of the circulation of the normal fetus at term.
(Modified after Dr. Maud Abbott.)

here to revert to the older mechanical theories of von Baer⁹ and suggest that at such a time, an excess of the natural torsion of the embryo combined with the dilatation of the neural canal might cause apposition, pressure, fusion, and absorption of the mandibular process, left lung, left sixth aortic arch; and also cause the irregularities of the septa of the heart.

The schema given by Dr. Abbott (Fig. 7)¹⁰ for the circulation in the normal fetus shows that the blood reaching the head and neck via the main branches of the aorta is made up of blood returning from the body capillaries (V) and the blood returning from the umbilical vein (A). We may represent this as mixed blood

(ΔV). In the schema of the phocomelus (Fig. 6), the blood reaching the head and neck is a mixture of the blood from the capillaries of the body (V), blood from the umbilical vein (Δ) and blood from the head via the superior vena cava (V'). We may represent this blood by ($\Delta V V'$).

Is this increased venous character of the blood reaching the head in the second case a factor in the production of the cystic condition of the embryo, with marked generalized distension of the lymphatic spaces, everywhere except in the small flipper-like hands and feet? Starling¹¹ has shown that the protein content of the lymph differs in various parts of the body, and is lowest in the extremities. It appears, therefore, that proteins which are able to exude from the capillaries may also transude into the lymphatics and there hold a large volume of fluid, so producing the general cystic condition. It is suggested that the increased venosity of the blood to the head of the phocomelus has produced that lack of oxygen supply to the capillaries which has led to the dilatation of the lymphatic spaces. On the other hand, if we accept the description of the fetal circulation which was given by Harvey and revived lately by Pohlman,¹² and agree that the blood of the two auricles is normally mixed blood, then this explanation of the cystic condition does not hold good. If the blood mixes in the auricles then all the chambers of the heart contain blood which will be represented by ($\Delta V V'$). It is not wise to regard a theory of the production of the cystic condition as an argument against the theory of Harvey, but it certainly does point to the need of confirming the experimental evidence brought forward by Pohlman.

As regards the lymphatic system it is important to note that according to Sabin¹³ and Lewis¹⁴ lymph sacs are first visible in the human embryo in the sixth week (10 mm.), and the valve between the lymph sacs and jugular veins appears in the seventh week. The relationship of the maldevelopment of the lymphatic system of this fetus to the maldevelopment of the circulatory system is obscure; but it is particularly interesting to note that both systems are subject to particularly rapid changes during the sixth and seventh week of intrauterine life. The condition of the specimen did not allow of an accurate examination of the lymphatic system.

(C) *The Vascular Supply of the Urogenital System.*—The origin of the renal arteries from the umbilical arteries is a rare anomaly, as these arteries are not accessory to renal arteries arising from the abdominal aorta. Accessory renal arteries have been described as arising from the inferior phrenic, the spermatic, a lumbar artery, the inferior mesenteric, from the bifurcation of the aorta, or the middle sacral artery, from the common iliac and very rarely from the internal or external iliac. Portal found in one instance the right and left renal arteries arising by a common trunk from the forepart of the aorta. The earliest attempt at depicting the variations of the renal vessels is in the *tabulae anatomicae*¹⁵ of Eustachius, published in 1564. The lowest of three cases shown is that in which Eustachius shows an accessory renal artery on the right side arising from the internal iliac and an accessory artery on the left side arising from the common iliac.

According to Felix,¹⁶ the accessory renal arteries are to be regarded as persistent mesonephric arteries. On the other hand Eben Hill,¹⁷ in a study of the vascular system of the wolffian body and kidney in pig embryos, shows no communication between the umbilical arteries and the renal and mesonephric arteries, all of the latter arising from the abdominal aorta. It is true that the stage which he depicts is a relatively late one, from 28 mm. onwards, when the renal artery is first seen penetrating the kidney. In a study of the vascular system of the Pfannenstiel embryo, III, (2.6 mm.), Felix has drawn attention to the marked development of the perintestinal rete and the rami intestinales at the point where the umbilical arteries arise from them; i. e., before the latter possess their definite origin from the aorta.

Felix points out that the primitive mesonephric arteries are dysmetameric and recede from the thoracic segments to the lumbar ones. The extent of this migration is so marked that as many as four arteries may lie in one of the lumbar segments with as many as thirty arteries in all supplying about eighty nephric tubules. These arteries become divided into three groups. The first or cranial group of arteries run dorsal to the suprarenal body; the second group pass through the suprarenal body, and the third or caudal group pass in front of the suprarenal bodies. The more caudal of the latter group pass distal to the suprarenal body. The first group usually gives rise to the inferior phrenic artery; the second gives rise to suprarenal and testicular or ovarian arteries; the last vessel of the second group or the first of the third group gives rise to the definitive renal artery of the adult. Since the mesonephric vessels are not segmental, and since they are characterized by a caudal migration which causes several of them (the most caudal of the third group of Felix) to lie caudal to the large suprarenal of the 20 mm. embryo, it is clear that the anomalous origin of the renal arteries from the umbilical arteries may be explained in the following manner. When the mesonephros of this particular specimen was growing caudally, the atrophy of the cranial tubules was markedly increased by the general hydrocephalic and cystic condition so that the migration of the mesonephric arteries passed beyond the usual limits and the number of arteries in the third group of Felix was increased. There was, in particular, a marked increase of the more caudal members of this group so that they came to take origin from the umbilical arteries. One of these arteries has persisted as the definitive renal artery in this case, and there is no trace of a more proximal renal artery. In other words the definitive single renal artery of this case is the artery which has so frequently been described from the time of Eustachius onwards as the accessory renal artery of adult anatomy. Thane¹⁸ gives the frequency of an accessory renal artery arising from the common iliac as 1 per cent, and the frequency of the condition in man as compared with its rarity in domestic animals is quite in keeping with the distribution of other vascular anomalies in man and animals. It was noted that the origin of the anomalous renal artery was from the ventral aspect of the umbilical artery, and not from the lateral aspect. Felix has described very minutely the characteristics of the migration of the origins of his three groups of mesonephric arteries and says: "The vessels of the first or dorsal group shift their origins to the dorsal surface of the aorta, those of the third group to the ventral surface, and only those of the second group preserve their original lateral position." Thus, the origin of the anomalous renal artery from the ventral aspect of the umbilical artery confirms the view that it corresponds to one of the distal members of the third group of Felix.

PATHOLOGIC CONSIDERATIONS

The curious monstrosity known as congenital cystic elephantiasis is probably related to general fetal dropsy and to that postnatal condition which is called cystic hygroma of the neck. The published cases have generally shown the mother to be a multipara, the pregnancy always ending prematurely with or without hydramnios, dropsy and albuminuria in the mother. There is always a lymphangiectasis of the skin, but it is not possible to say whether this is a primary condition as there is always an associated defect in the heart with or without umbilical hernia. The case described by Lindfors¹⁹ displayed a common ventricle, common auricular-ventricular opening and incomplete auricular septum. There is no method of definitely stating

whether the lymphatic defect is primarily due to an error in the formation of the primitive lymphatic system or whether it is secondary to the defect in the vascular system. Yet it is important to note that most of the defects of the vascular and respiratory system as well as those of the skeletal system fall within that period of time which is also the critical period in the lymphatic system and in its union to the venous system. There is not necessarily any association between the phocomelus condition, and the generalized cystic condition; for in Ballantyne's case²⁰ the phocomelus was associated only with defective ossification of the frontal bones whereas Baxter Tyrie's case²¹ showed phocomelus in association with umbilical hernia, diaphragmatic hernia, left inguinal hernia, cleft palate, incomplete interventricular septum and spina bifida in the dorsolumbar region. Most cases of phocomelus show some traces of the proximal segments of the limb and on the whole the lower limb tends to be more regularly developed than the upper. It is not possible to bring forward any evidence as to the extent to which phocomelus is related to such general conditions as achondroplasia with its dwarfing of the limbs or to localized conditions, such as amelus or hemimelus.

CONCLUSIONS

The association of two conditions, such as phocomelus and general cystic elephantiasis in one and the same fetus is decidedly rare, particularly as the former condition may exist without anomalies of the other systems, whereas the latter is invariably associated with multiple anomalies of the vascular, urogenital, and alimentary systems. The skeletal anomalies of the specimen, apart from the presence of an ossified humerus, suggest that the conditions of nutrition of the embryo were unfavorable during the sixth and seventh week of embryonic life. The failure of the secondary palatal processes, the rudimentary tongue and absence of the left lung are all associated with the sixth week. The anomalies of the heart, arterial system and lymphatic systems also fall into this period. It is true that the hydrocephalus, dilated spinal canal, and irregularities of ossification of the vertebral column may be only late manifestations of peculiarly nociceptive conditions during the precartilaginous and cartilaginous periods; but as a rule, such early errors in development, occurring before the sixth week, are manifested by some degree of anencephaly, iniencephaly, and gross errors in the cervical and lumbodorsal region. That is to say, that the head and tail bends of the embryo are regions peculiarly liable to display gross deformity during the third to the sixth week of embryonic life.

No causal relationship between the phocomelic and general cystic condition can be put forward; nor can any suggestion be made as to

the nature of the nutritional disturbance in the mother or fetus. The time factor, from a consideration of the associated anomalies, points to the sixth and seventh week as the period when the growth of the embryo was severely interrupted.

My thanks are due to Dr. T. B. Davies, of Queen Charlotte's Hospital, who so kindly obtained the specimen; to Miss Russell and Mr. Maxwell, who executed the drawings, and to my colleagues at University College and Washington University.

REFERENCES

- ¹Rokitansky, C.: *Syd. Soc. Trans.*, 1854, i, 29.
- ²Harris, H. A.: *Proc. Roy. Soc. Med.*, 1924, xvii, 35-48.
- ³Abbott, M.: *Congenital Cardiac Disease*. Osler and McCrae's *Modern Medicine*, 1915, vol. iv, p. 375.
- ⁴Preiz: *Ziegler's Beiträge*, 1890, vol. vii, p. 247.
- ⁵Harris, H. A.: *Jour. Anat.*, 1922-23, lvii, 76-95.
- ⁶Bremer, J. L.: *Am. Jour. Anat.*, 1902, i, 137-144; *Anat. Rec.*, 1908, iii, 335.
- ⁷Blisnianskaja, G.: *Zur Entwicklungsgeschichte der Menschlichen Lungen: Bronchialbaum, Lungenform*, Dissert., Zurich, 1904.
- ⁸His, W.: *Anatomie menschlicher Embryonen*, Leipzig, Part I.
- ⁹von Baer: *Entwicklungsgeschichte*, 1837.
- ¹⁰Abbott, M., and Dawson, W. T.: Reprint from *Internat. Clin.*, 1924, iv, Series 34.
- ¹¹Starling, E. H.: *The Fluids of the Body*, London, 1909.
- ¹²Pohlman, A. G.: *Bull. Johns Hopkins Hosp.*, 1907, xviii, 409-412.
- ¹³Sabin, F.: *Am. Jour. Anat.*, 1909, ix, 43-90.
- ¹⁴Lewis, F. T.: *Am. Jour. Anat.*, 1909, ix, 33-42.
- ¹⁵Eustachius: *Tabulae Anatomicae*. Edition of Lancisius, Rome, 1728, p. 6.
- ¹⁶Felix, W.: *The Development of the Urogenital System*. *Manual of Embryology*. Keibel and Mall, 1912, ii, 822.
- ¹⁷Hill, Eben C.: *Bull. Johns Hopkins Hosp.*, 1905, xvi, 60-64.
- ¹⁸Thane, G. D.: *Quain's Anatomy*, 1892, ed. 10, ii, Part II, 466.
- ¹⁹Lindfors, A. O.: *Ztschr. f. Geburtsh. u. Gynäk.*, 1890, xviii, 258.
- ²⁰Ballantyne, J. W.: *Antenatal Pathology and Hygiene*. *The Embryo*, Edinburgh, 1904, p. 258.
- ²¹Tyrie, Baxter, and Haigh, J. W.: *Teratologia*, 1894, i, 89.

JANICEPS ASYMMETROS, WITH THE REPORT OF A CASE

BY GEORGE T. PACK, B.S., M.D., AND IVAN C. BERREY, B.S., M.D.,
UNIVERSITY, ALABAMA

(From the Departments of Pathology and Anatomy, School of Medicine, The University of Alabama)

THE name Janus is derived from the two-faced Roman god Janus, to whom the month of January was sacred. Janus monsters are rather frequent. Licetus reported one in the year 1668.

Of the disomata, the terata with which we are concerned are the terata anadidyma. These monsters in general have united cephalic poles and divergent caudal extremities, producing a fetus which is more or less single above and plural below.¹ In syncephalus or syncephaliens there is a fusion of the head and trunk. The types of Syncephali are Janus monsters, which are either symmetrical or asymmetrical. The monstrosity reported herein is called janiceps asymmetros. The asymmetry is caused by the fact that the two axes of the body are not exactly parallel, but inclined to each other at an angle so that the well-formed face is composed of the left head, which projects anteriorly, giving the aspect of a single countenance to a more or less double body. The malformed and opposite face is the asymmetrical side and is produced by an abortive development of the median portion of the anterior surface. Hence the janiceps asymmetros possesses a perfectly developed face on one side, whereas the opposite face is very rudimentary and portrays varying degrees of fission.

A synonym for the prozygotic Janus asymmetros is the term Janus ateleus, which is occasionally used. The Janus monster is also a type of cephalothoracopagus and of the dihypogastric monsters. Moreover, it also belongs to the omphalopagi or monomphaliens, implying the possession of a common single navel and umbilical cord by the two component individuals of the monster.

REPORT OF A CASE OF JANICEPS ASYMMETROS

This monster was born of normal young white parents. The mother was delivered by Dr. W. C. Gewin, of Birmingham, Alabama, to whom we are indebted for this fetus. Double monsters are practically never diagnosed until the onset of labor, except probably in those clinics where roentgenograms are taken, although a multiple pregnancy is sometimes suspected.

The delivery of this monster was spontaneous. The vertex presented. The Janus monsters of Commiskey and of Sterley were spontaneously delivered with the vertex presenting.^{23, 2} One factor that prevents a possible dystocia is that this type of monster rarely goes to full term, hence the entire monster is seldom larger than a normal fetus at term. This fetus was born at the completion of the eighth lunar

month of gestation. Keibel and Mall have stated the essentials for uninterrupted uterine development as follows: "The embryo must not be extreme enough to eliminate the heart, and the chorion must be normal enough to permit the formation of a healthy placenta which begins to differentiate at the end of the second month." Even before the expiration of the second lunar month, gross errors of development can be easily discerned. Marchand claims that 0.6 per cent of all births are monsters. A great number of the early abortions may be of monstrous embryos. The monster was a stillbirth. Janiceps, even at full term are not viable for any length of time. Both individuals of the double monster were of the female sex. It should be recalled that all homologous twins are of the same sex.



Fig. 1.—View of well-formed face.

The father and mother were the parents of three healthy well-formed children. There was no history of venereal disease. Family history records that no malformations of any kind existed among the known members of the maternal and paternal families.

There are certain facial malformations associated with cyclops. Usually with a defect of the anterior portion of the plastic material for the chorda dorsalis, there is an arrested development of the first branchial arch and cleft. Consequently, accompanying cyclopia there is found a synotia, agnathia, astomia and other deformities. These deformities commonly occur together, and when they do, the face is called Cyclops hypoagnathus (Cyclotia), or Edocephalians.

The nose of this cyclopidian face is markedly changed because the frontonasal

process is defective. The nasal rudiment was found in the middle of the forehead in the glabellar region, above the single eye (Fig. 2). This nasal proboscis is tiny, rudimentary, solid, pedunculated, and slightly constricted at the base. Histologic sectioning reveals no vestiges of mucous membrane, nasal canals or cartilages. The interior is composed of connective tissue, fat and smooth muscle. The nose is covered by normal epidermis. Above this nose and extending downward and laterally are two slightly pigmented lanuginous areas, which are of normal contour and which appear to be the eyebrows. This brevity of the nasal prominence (brachyrhynchus) has been explained as due to the deficiency of the intermediate jaw bones.¹⁰ The absence of the nasal fossae can be explained by the fusion of the superior maxillary



Fig. 2—View of the malformed face.

processes and consequent disappearance of any of the structures which normally would have intervened.

The eye of the cyclopiian face is single. Cyclopia may at times show all the variations of fusion of the two optic vesicles, i. e., there may be two eyes in a single orbit or the two eyes may fuse until they are single. There is a single cornea, one lens and one optic nerve. There is no optic chiasm, but a single optic tract entering the cranium through a single optic foramen. This optic tract represents the fused bilateral components. Ordinarily the fused eye is larger than a single normal eye, but in our specimen the eye is smaller (microphthalmus). The palpebral aperture is triangular in outline. The upper eyelids are not fused. The lower eyelids are represented by a single lid, in the middle of which is a single lachrymal caruncle and papilla. The single eye is much larger than it appears in the illustration (Fig.

2—beneath rudimentary nose). The palpebral aperture is small (blepharophimosis). The internal recti muscles are absent. There is one external rectus muscle at each lateral angle of the eye. There are several superior and inferior muscles of the eyeball, which could not be identified.

The orbit is single and there is an absence of the bones that normally intervene between the two orbits.¹³ Ballantyne¹⁶ states that in cyclopia, "the orbit is bounded above by the frontal bones, at the sides by the malais and greater wings of the sphenoid, and inferiorly by the fused orbital plates of the superior maxillae (with-

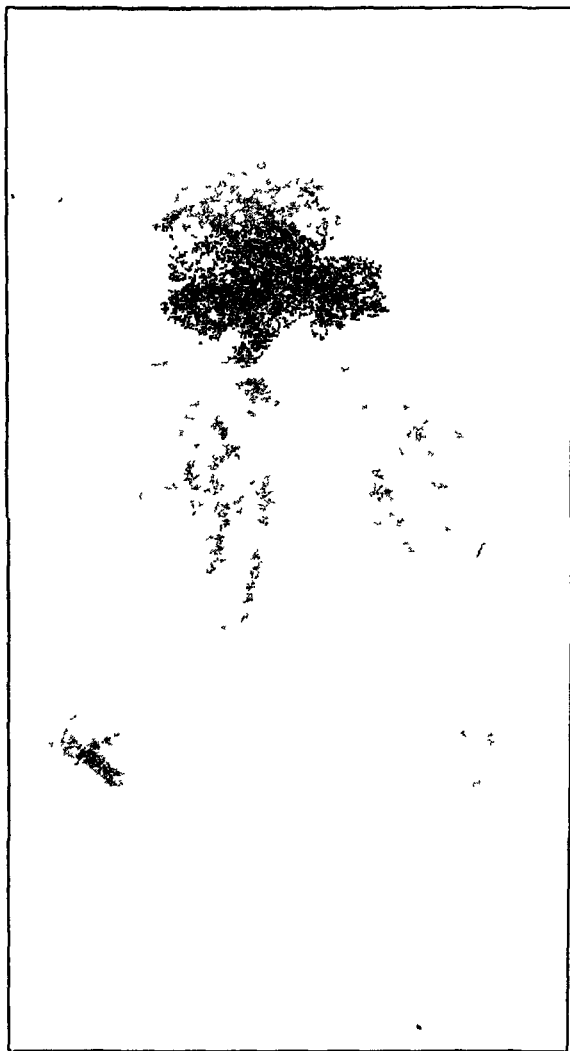


Fig. 3.—Roentgenogram. Anterior view of well-formed face

out the nasal process). At the fundus of the orbit is a rounded opening bounded by the malformed lesser wings of the sphenoid, by the sella turcica and by the frontal bone; through this foramen comes the optic nerve." We verified the entrance of the optic nerve.

Some of the bones of the malformed or cyclopic face are lacking, viz., nasal, vomer, lachrymal, ethmoid, inferior turbinate, palatine and the pterygoid process.

The mouth and lower jaw of the cyclopic face are absent. We have previously mentioned that in those instances when the frontonasal process and the first pair of branchial arches are aplastic that the complex deformity which results is known as Cyclops hypoagnathus. Not the least obnoxious of these is the absence of the lower

jaw (agnathia) and the absence of the mouth (astomia), which are the conditions found in this specimen. A complete agnathia is rare.

Otocephaly or synotia (approximation or fusion of the ears beneath the skull) is another concomitant of the cyclopic deformities. Etiologically, the same theories have been applied to it as to the synophthalmus; (1) incomplete development of brain (medulla oblongata) permitting the coalescence of the auditory vesicles (Dareste)¹⁶ and (2) arrested development of the first branchial arches (Blanc),¹⁶ (Bischoff) permitting approximation beneath the skull. The ears of the malformed face have not completely united, as there is a narrow strip of skin intervening (Fig. 2). A probe passed through each middle ear opens into the common pharynx. The connection between the single pharynx and each middle ear is almost too short to be called an Eustachian tube; the middle ear is practically continuous with the pharynx.

In Fig. 2, just below the single eye, there is a slightly oval projection which is covered by a thick, heavy skin supplied with fine lanugo hairs. Beneath this is a serous membrane forming a sac, which contains a debris of necrotic tissue very similar to brain substance. The serous coat is a continuation of a process from within the skull. We were inclined to call this an encephalocoele, because of the character of the debris it contained. The sac was heavily pigmented which we interpreted as

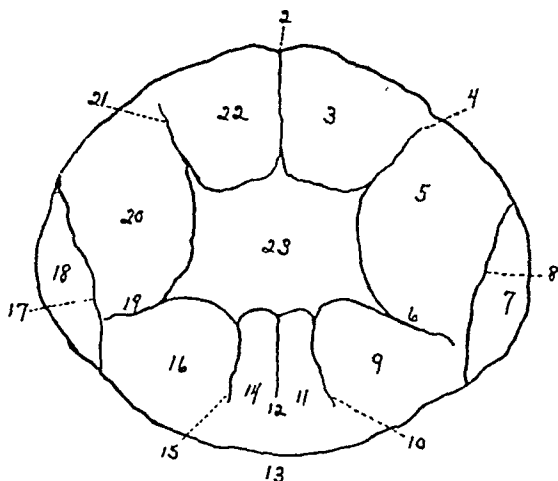


Fig. 4.—Upper aspect of the skull. Calvaria seen from above. 1, Side of well-formed face; 2, metopic suture; 3, frontal bone; 4, coronal suture; 5, parietal bone; 6, sagittal suture; 7, occipital bone; 8, lambdoid suture; 9, parietal bone; 10, coronal suture; 11, frontal bone; 12, metopic suture; 13, side of malformed face; 14, frontal bone; 15, coronal suture; 16, parietal bone; 17, lambdoid suture; 18, occipital bone; 19, sagittal suture; 20, parietal bone; 21, coronal suture; 22, frontal bone; 23, octagonal fontanelle.

a possible melanin deposit in the meninges. Furthermore, Planchon and Taruffi individually have reported instances where cephalocoele accompanied cyclopia.

The vertex of the calvarium is abnormal (Fig. 4). This illustration portrays the odd configuration of the calvaria. There are no posterior fontanelles, but the two anterior ones are represented by a large octagonal fontanelle. The proportionate size of allotment of the cranial bones to the faces is well shown. The metopic sutures are present in both frontal bones. The occipital bones are placed laterally to the faces, as are the cerebelli. In our description we have oriented all the structures in relation to the two faces.

The cerebra of the Janus monster were in such a necrotic state that they permitted little more than a cursory examination. There are two cerebra, one for the well-formed face and one accompanying the cyclopic face. The latter brain is rudimentary. The cerebral surface is smooth and only slightly marked by gyri or sulci. The rudimentary brain is not divided into hemispheres, but is a single small lobe,

divided from the larger and more perfectly developed brain by a fissure, which we are pleased to call the intercerebral fissure. This single lobe possesses no falk cerebri, sagittal fissure, olfactory lobe, corpus callosum, septum pellucidum, etc. A single internal cavity represents the ventricles. The larger brain, although more normal, is as yet not completely developed. The temporal, frontal and occipital lobes are well marked out. There are two brain stems.

The base of the skull can be arbitrarily divided into two sections for description, according to the allotment for occupancy by the two different brains. (See Fig. 5.)

On the well-formed side, the squamous portion of the temporal bone, the orbital process of the frontal bone, the crista galli and the ethmoid plate are normal in structure and in position. The middle fossae are normal except that the petrous portions of the temporal bones form parts of the floors of the middle fossae instead of the posterior boundaries. The tentorium cerebelli (both sides) is attached anteriorly to the petrous portion of the temporal bone and consequently forms a part of the floor of the middle fossa. The tentoria are also attached anteriorly to the anterior clinoid processes, and laterally (relative to the faces) the attachments are very high up on the occipital bones at the level of the lambdoid sutures. These

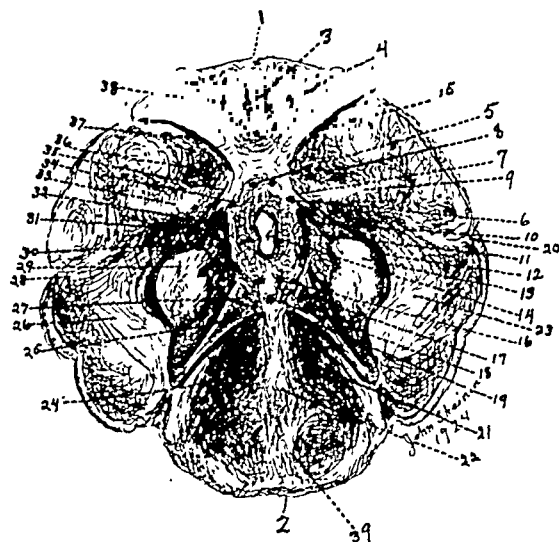


Fig. 5.—Base of skull seen from above. (Tentoria cerebelli and cerebella still in situ.) 1, Side of well-formed face; 2, side of malformed face; 3, crista galli separating the two cribriform plates; 4, anterior cranial fossa; 5, two optic nerves for the well-formed face; 6, right internal carotid artery (well-formed face); 7, anterior clinoid process with tentorium cerebelli attached; 8, middle cranial fossa; 9, petrous portion of the temporal bone; 10, abducent nerve; 11, oculomotor nerve; 12, free edge of tentorium cerebelli; 13, brain stem; 14, quadrilateral opening formed by the fusion of the two sellae turcicae; 15, posterior border of the lesser wing of the sphenoid bone; 16, left internal carotid artery (malformed face); 17, abducent nerve (malformed face); 18, single optic nerve for malformed face; 19, anterior clinoid process with tentorium cerebelli attached; 20, internal occipital protuberance (torcular herophili); 21, middle cranial fossa; 22, fused orbital plates of frontal bones forming a saddle-shaped ridge; 23, superior surface of tentorium cerebelli; 24, middle cranial fossa; 25, anterior clinoid process with tentorium cerebelli attached. The two anterior clinoid processes of the malformed side are almost fused. 26, Superior surface of tentorium cerebelli; 27, abducent nerve; 28, internal occipital protuberance (torcular herophili); 29, brain stem; 30, free edge of tentorium cerebelli; 31, abducent nerve; 32, oculomotor nerve; 33, petrous portion of the temporal bone; 34, left internal carotid artery; 35, anterior clinoid process with tentorium cerebelli attached; 36, middle cranial fossa; 37, posterior border of the lesser wing of the sphenoid bone; 38, anterior cranial fossa; 39, small anterior cranial fossae fused.

tentoria are exceedingly tough. They are located laterally, with relation to the faces, as are the occiputs and the cerebella. There are two tentoria, one for each brain. The optic foramina, optic nerves, oculomotor nerves, abducent nerves and internal carotid arteries are normal. The bodies of the two sphenoid bones have fused to make a single sella turcica. Within this sella turcica there is a quadri-

lateral opening which contains tissue, which we interpret as the hypophyses. The two posterior clinoid processes of the well-formed side are united with the two posterior clinoid processes of the malformed side to form a ridge on each side of the sella turcica. Relative to either face, these ridges run anteroposteriorly and lateral to the position of the hypophyses or immediately between the two brain stems. The tentoria cerebelli have free edges mesially where they come in contact with the junction of the brain stems and the cerebral hemispheres. The middle cranial fossae of this well-developed part are not separated by the sella turcica as normally, but because of their more anterior position, the intervening structure is the anterior clinoid process and the root of the ridge formed by the lesser wing of the sphenoid.

On the malformed side the crista galli and ethmoid bone are absent. The anterior cranial fossae as such are absent, but in place of them is a saddle-shaped prominence formed by the orbital processes of the frontal bones and extending back to the ridges of the posterior clinoid processes. The middle cranial fossae of this part are small and not separated by the sella turcica as normally, but because of their more anterior position, the intervening structure is the saddle-shaped prominence caused by the union of the orbital processes of the frontal bones. There are only one optic foramen and one optic nerve. There are two internal carotid arteries and two abducent nerves in their normal positions.

There are two cerebella, each of which is normal and located in the posterior cranial fossa. (Fig. 6.) These posterior cranial fossae are in the occipital areas and lateral to the faces. The trigeminal nerves are normal in position, relative to each cerebellum and posterior cranial fossa. There are two of these nerves on each side (Fig. 6). A very interesting phenomenon is that the well-formed face receives two trigeminal nerves, but each nerve is from a separate brain stem. The malformed face likewise receives one trigeminal nerve from one brain stem and the other half of the face is supplied by the trigeminal nerve from the opposite brain stem. This same anomalous distribution of cranial nerves is true for the III, VI, VII, VIII nerves, and possibly the IV but we are unable to confirm the trochlear distribution. The position of the posterior cranial fossae, the cerebella and the manner of distribution of the cranial nerves lead us to believe that each face is composed of elements from both of the fetal components. In other words, one-half of each face belongs or is continuous with the body on that particular side.

The single foregut is evidently common to the fetuses, since they also have the same pharynx, the same esophagus and stomach. The roof of the common pharynx is formed by a sac-like structure which is attached superiorly to the brim of the quadrilateral opening formed by the sella turcica. The pharyngeal outpocketing for the mouth of the malformed face is present but does not open externally as there is no oral plate. The mouth of the well-developed face opens into the single oral pharynx. The foregut evidently sprang from the anlagen of both feti, because the larynx is duplicated. The larynx of each side is normal and fully formed. The single common esophagus lies between the two larynges. (Fig. 7.)

The chests are fused above the umbilicus (thoracopagic). There are two nipples on each side. There is a sternum on each side of the body, directly under the face. The ribs extend from the sterni to the spinal columns which are laterally located, relative to the faces. The muscles of the pectoral regions are normal.

The single esophagus runs through the thoracic cavity to the diaphragm, piercing it.

The two larynges are continuous with two tracheas and two sets of lungs. The lungs are situated in the thoracic cavity, in a location lateral to the faces or anterior to each spinal column. The lungs are normal but atelectatic.

There are two separate hearts each of which is two-chambered. These hearts are located in the central part of the thoracic cavity, mesial to the two sets of lungs, and immediately substernal. We believe that these two (two-chambered) hearts are not simply separated portions of the same single heart, but rather that they are separate rudimentary hearts. The atrium of each heart shows indication of two auricles, but the absence of the interauricular septum. Theremin has reported the absence of this septum accompanying cyclopia.

The heart on the well-developed side is a two-chambered heart. One large atrium and one large ventricle are present. The atrium and ventricle are larger than the opposite heart and evidently more actively functional. The atrium has two auricles or pockets, the cavities of which communicate. Only one semilunar and one atrio-ventricular valve are found. The semilunar valve has three cusps. The ventricular wall is very thick. The papillary muscles and chordae tendinae are normal. The

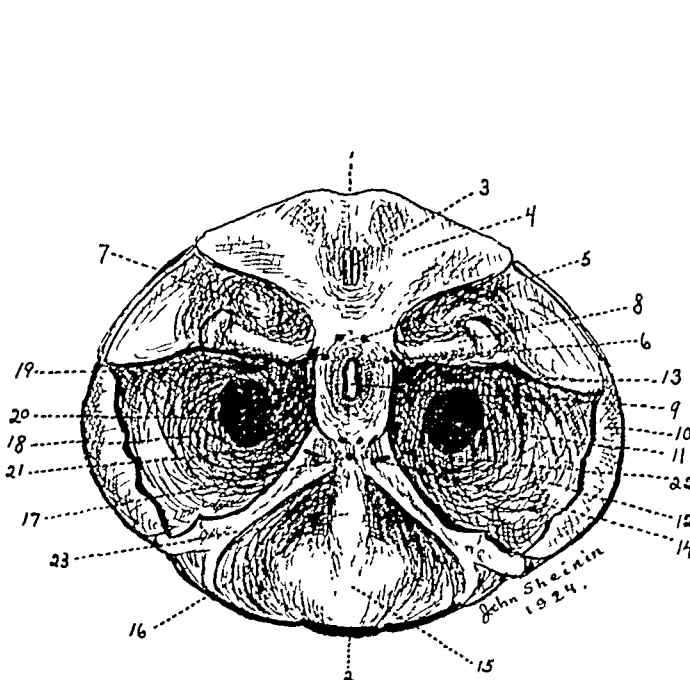


Fig. 6.

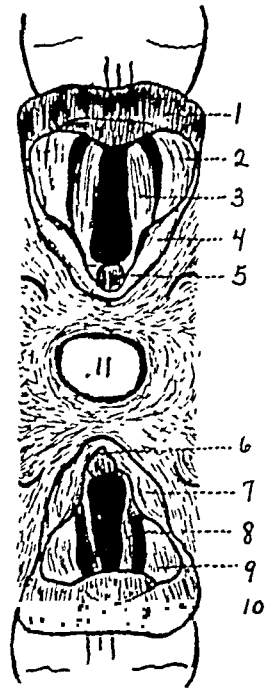


Fig. 7.

Fig. 6.—Base of skull seen from above. 1, Side of well-formed face; 2, side of malformed face; 3, crista galli separating the two cribriform plates; 4, anterior cranial fossa; 5, two optic nerves for the well-formed face; 6, right internal carotid artery (well-formed face); 7, middle cranial fossa; 8, petrous portion of the temporal bone; 9, quadrilateral opening formed by the fusion of the two sellae turcicae; 10, occipital bone; 11, great occipital foramen; 12, posterior cranial fossa (fossa for lodgment of cerebellum); 13, right trigeminal nerve for the well-formed face; 14, abducent nerve; 15, small anterior cranial fossae fused; 16, middle cranial fossa; 17, single optic nerve for malformed face; 18, posterior cranial fossa; 19, left trigeminal nerve for well-formed face; 20, great occipital foramen; 21, right trigeminal nerve for malformed face; 22, left trigeminal nerve for malformed face; 23, fused orbital plates of frontal bones forming a saddle-shaped ridge.

Fig. 7.—Double larynx with interposed esophagus viewed from above. 1, Epiglottis; 2, false vocal cord; 3, true vocal cord; 4, cartilage of Wrisberg; 5, arytenoid commissure; 6, arytenoid commissure; 7, cartilage of Wrisberg; 8, true vocal cord; 9, false vocal cord; 10, epiglottis; 11, esophagus.

aorta gives off four or five unidentified branches, one of which is continuous with the aorta from the opposite heart.

The heart on the malformed (cyclopian) side is also a two-chambered heart. One large atrium and one large ventricle are present. The semilunar valve is normal but the atrioventricular valve is atypical. A large vein entering the atrium is continuous with a large vein of the other heart. In other words, a venous arch is present,

which has tributaries. The artery is single and is continuous with the large artery leading from the other heart, hence an aortic arch exists between the two hearts. This aortic arch gives off subsidiary branches. There are two descending aortae.

This fetus is an omphalopagus because it possesses a single umbilical cord with a single artery and one vein. There is a hernia at the umbilicus, i. e., the area immediately surrounding the umbilical junction is not supplied with normal skin. The cord is eccentrically attached. Ballantyne has noted the occasional occurrence of an umbilical hernia and a single umbilical artery with cyclops.

There are two separate livers, connected by the diaphragm and lesser omentums. The livers are so arranged that the smaller of the two is on the side of the cyclopic face, and the larger one on the side of the well formed face. The livers are not normally shaped. The large liver possesses a gall bladder. In the small liver there is no falciform ligament or gall bladder present.

Only one large spleen was found. It was free and attached only to the stomach by the gastrosplenic ligament.

The single stomach is continuous with the common esophagus. The stomach, duodenum, and a large part of the jejunum lie above the umbilicus and are situated between the livers. There is a single duodenum. The jejunum divides about half



Fig. 8.—Roentgenogram of left hand of malformed side.



Fig. 9.—Roentgenogram of right hand of malformed side.

way into two branches which continue out into the respective abdominal cavities of the feti. There are two appendices.

The kidneys, bladder, uterus and adnexa are all normal and bilaterally represented.

The right, less developed fetus has no umbilical artery. That is to say, the internal iliac is normal but gives no functional hypogastric artery to the umbilicus to enter into the placental circulation. The left fetus has one large hypogastric coming from the right internal iliac. This artery is very large and forms the umbilical artery (the single tributary).

On the side of the well-formed face the arms and hands are normal. On the side of the malformed face there are certain abnormalities. In both forearms, the ulna is one and a half times as long as the radius. This causes a marked abduction of the hands on the wrist, similar to the deformity produced by destruction of the distal epiphysis of the radius.

On the malformed side the left thumb is represented by a tiny papilla the size of a pinhead on the radial side of the base of the index finger. This agenesis or aplasia of the thumb is usually associated with an absence of its metacarpal and the radius, the malformation being known as radial ectrodactyly. The metacarpal is lacking but the radius is present. The right thumb is rudimentary and club-like. There are only four metacarpals.

REFERENCES

- ¹Jaggard, W. W.: Chapter on Joined Twins in the Cyclopaedia of the Diseases of Children, by J. M. Keating. Vol. I, Philadelphia, J. B. Lippincott Co., 1889.
- ²Marchand: Eulenberg's Realencyclopaedie der ges. Heilkunde art. Missbildungen.
- ³Parvin: American System of Obstetrics, Lea and Febiger, Philadelphia, 1895, Vol. I, p. 780.
- ⁴Valentin: Arch. f. phys. Heilk., 1851. Quoted by Keibel and Mall.
- ⁵Gould, G. M. and Pyle, W. L.: Anomalies and Curiosities of Medicine, 1900, Philadelphia, W. B. Saunders Co.
- ⁶DeLafield and Prudden: A Textbook of Pathology, 1919, New York, Wm. Wood and Co., pp. 355 and 1110.
- ⁷Williams, J. W.: Obstetrics, 1920, New York, D. Appleton and Co., p. 859.
- ⁸Ewing, J.: Neoplastic Diseases, 1922, Philadelphia, W. B. Saunders Co., p. 954.
- ⁹Cragin, E. B.: Obstetrics, Philadelphia, Lea and Febiger, p. 699.
- ¹⁰Rokitansky, C.: A Manual of Pathological Anatomy, Blanchard and Lea, 1855, i, 23.
- ¹¹Keibel, F., and Mall, F. P.: A Manual of Human Embryology, 1910, Philadelphia, J. B. Lippincott Co., p. 229.
- ¹²Shufeldt, R. W.: Medical Record, April 13, 1918.
- ¹³Lamb, D. S.: Mil. Surgeon, October, 1911, p. 374.
- ¹⁴Born: Roux's Arch. 1897, iv. Quoted by Keibel and Mall.
- ¹⁵Wilson: Jour. of Morphol., 1893.
- ¹⁶Ballantyne, J. W.: Manual of Anatenatal Pathology, Vol. II, 1905, New York, Wm. Wood and Co.
- ¹⁷Driesch: Ztschr. f. wissensch. Zoöl., 1892, lv. Quoted by Keibel and Mall.
- ¹⁸Vejdovsky: Entwicklsg. Untersuchungen, Prag., 1890.
- ¹⁹Hubner, H.: Ergebnisse der allgemeinen Pathologie und Pathologischen Anatomie, 1911.
- ²⁰Harrison: Am. Jour. Anat., 1904, iii.
- ²¹Tornier: Roux's Arch., 1905, xx. Quoted by Keibel and Mall.
- ²²Schultze, O.: Roux's Arch., 1895, i.
- ²³Commiskey: Am. Jour. Obst., May, 1917, lxxv, 840.
- ²⁴Lewis: Anat. Record, 1908, iii.
- ²⁵Spemann: Stizungsber. d. phys.-med. Gesellsch., Wurzburg, 1900.
- ²⁶Schultze, O.: Verhandl. d. anat. Gellsch., 1894. Quoted by Keibel and Mall.
- ²⁷Ysander, F.: Upsala Läkareförenings Förhandlingar. Ny Följd. Trettionde Bandet. Sept. 16, 1925, pp. 319-375.

SEBACEOUS GLANDS IN THE HUMAN NIPPLE

BY ORMAN C. PERKINS, A.M., M.D., AND ADAM M. MILLER, A.B., A.M.
BROOKLYN, N. Y.

(From the Department of Anatomy, The Long Island College Hospital)

VARIOUS textbooks of anatomy and histology contain such statements as these: "These (sebaceous glands) are branched sacular glands which may be subdivided into classes, (1) those whose ducts open into the hair follicles, and (2) those whose ducts open upon the free surface of the epidermis. The former are by far the more numerous; the latter occur in the skin of the face, red margins of the lips, labia minora, glans penis and prepuce, and the tarsal glands of the eyelids. With the above exceptions the distribution of the sebaceous glands is coextensive with that of the hair."¹ "Sebaceous glands are found in some regions devoid of hairs, as in the margins of the lips, glans penis, prepuce, glans clitoris and labia minora."² "The distribution of the sebaceous glands in the skin is closely connected with that of the hair follicles into which they pour their contents. Exceptions to this rule occur in only a few regions of the body, as, for instance, in the glans penis and foreskin (Tyson's glands), in the labia minora, angle of the mouth, glandulae tarsales and the meibomian glands of the eyelids, etc."³ In this group of observations there is no indication that sebaceous glands are found in the nipple.

In other texts we find the following statements: "In the region around the nipple sudoriparous and sebaceous glands develop, the latter also occurring within the nipple area and frequently opening into the extremities of the lacteal ducts."⁴ "In the area around the nipple—the areola—numerous sudoriferous and sebaceous glands develop, some of which come to open into lacteal ducts."⁵ "The nipple and areola contain also abundant sebaceous glands; and sweat glands are present in the periphery of the areola."⁶ These statements indicate that sebaceous glands are present in the nipple and in two instances point out that they open into the lacteal ducts.

In a third group we find statements in which the authors have attempted to explain the presence of these glands. "Over both areola and nipple the skin is provided with large sebaceous glands, the secretion of which is increased during lactation and serves as protection during nursing."⁷ "The corium of the nipple has many large vascular and nervous papillae and there is no fat in it. Hairs and sudoriferous glands are absent, but sebaceous glands are present in large numbers. Their secretion here and over the areola serves to

keep the skin soft and to protect it from the saliva of the nursing infant.'"⁸

In addition to the exceptions noted above, we desire to record our observations on the sebaceous glands of the human nipple. These glands have been noted by some authors and apparently overlooked by others. Their importance from a purely histologic as well as from a practical standpoint seems to justify a record of the findings in a large series of nipples.

Nipples were collected from forty male and female bodies varying in age from twelve to sixty-five years. In all of the specimens, regardless of sex or age, sebaceous glands were found.

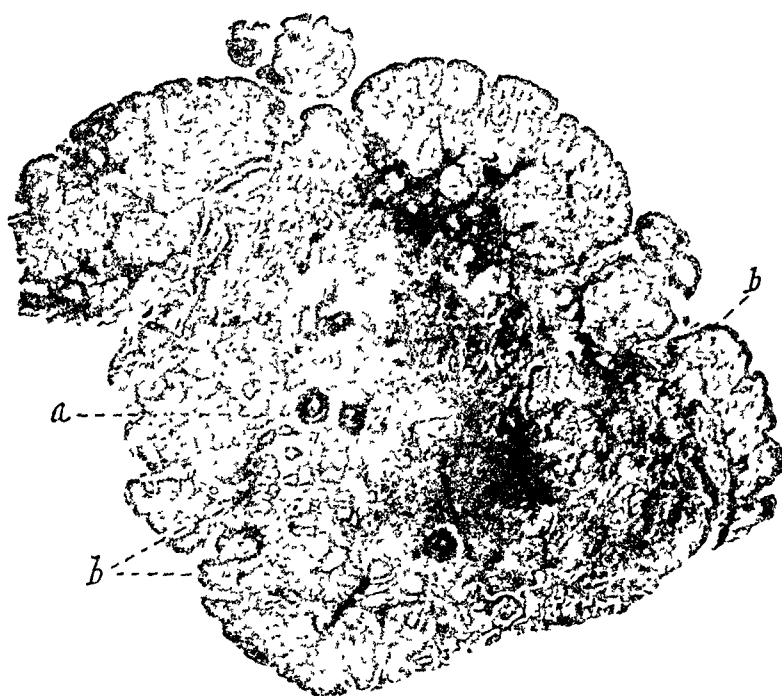


Fig. 1.—Cross section of the tip of a nipple of an adult female in which the mammary gland was in a resting condition. (a) Milk ducts; (b) sebaceous glands.

For the most part these glands are compound, having from six to nine saccules; occasionally a gland is formed by a single saccule. Each gland opens directly onto the surface of the nipple through a short duct. In no instance was one found to empty into a hair follicle or into a lacteal duct. Structurally the glands differ in no way from the sebaceous glands found in the other parts of the body. They are embedded in the dense areolar tissue and smooth muscle which makes up the stroma of the nipple (Fig. 1). The saccules are composed of polyhedral epithelial cells, the outermost of which are cuboidal but in some instances flattened. The cytoplasm of the outermost cells stains with the common cytoplasmic dyes and the nuclei are quite

basophilic, while the cytoplasm of the central cells, which are larger, take very little if any of the dye and the nuclei are pale (Fig. 2). We may infer that the outer cells represent the daughter cells of recent mitotic division, in which the process of fatty degeneration has not taken place. The outer layer of cells of each saccule rests upon a basement membrane.

Each saccule is surrounded by collagenous tissue which is destitute of smooth muscle fibers. This collagenous layer contains many blood ves-

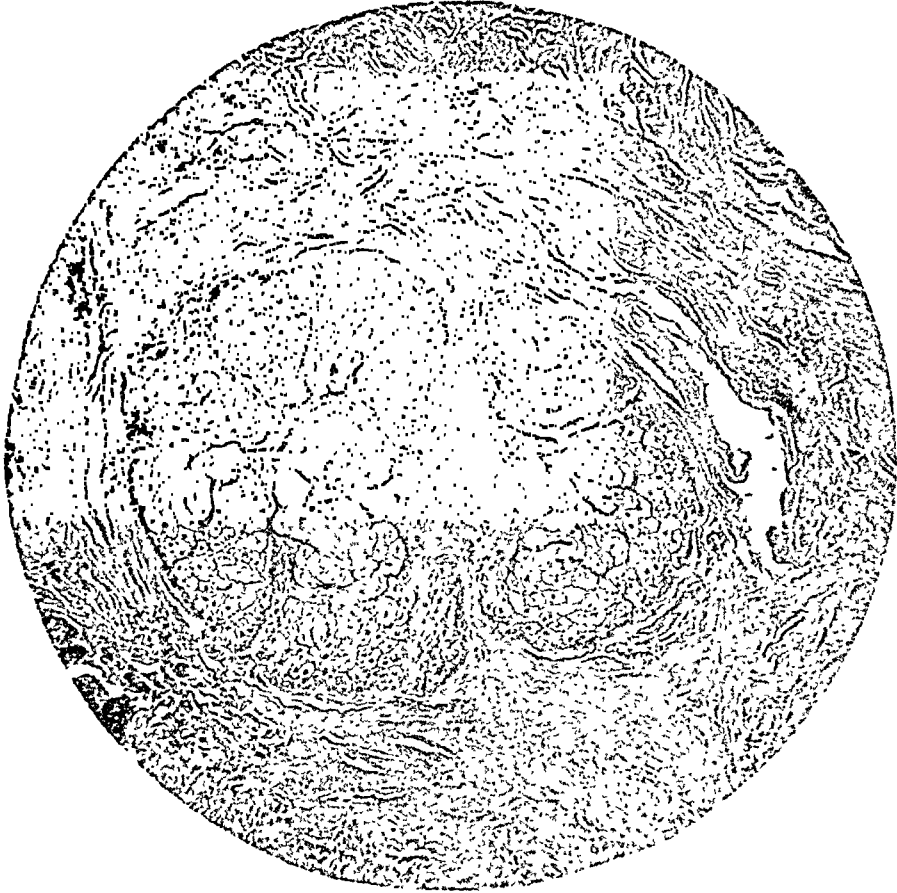


Fig. 2.—Section of a sebaceous gland in the nipple of an adult female with a resting mammary gland.

sels and the capillary network is closely applied to the basement membrane. In the connective tissue surrounding the entire gland there are long slender bundles of smooth muscle fibers. These bundles are more compact than in other parts of the stroma in the tip of the nipple, having much the same appearance as the arrector pili muscle. It is reasonable to assume that the smooth muscle plays a part in the expulsion of the glandular contents.

The glands are found only at the tip of the nipple and the ducts for the most part empty upon the surface of the tip, although a few may open on the sides of the nipple but in no instance more than $1\frac{1}{2}$

mm. from the tip. From this level to the areola, no glands were found in any specimen.

The ducts of the sebaceous glands are lined by stratified squamous epithelium which diminishes in the number of layers, but the cells increase in thickness as they approach the gland until finally we have a double layer of cuboidal cells and finally a single layer of flattened cuboidal cells.

During the period of lactation there is an apparent growth or budding from the primary saccules so that the entire gland is enlarged to

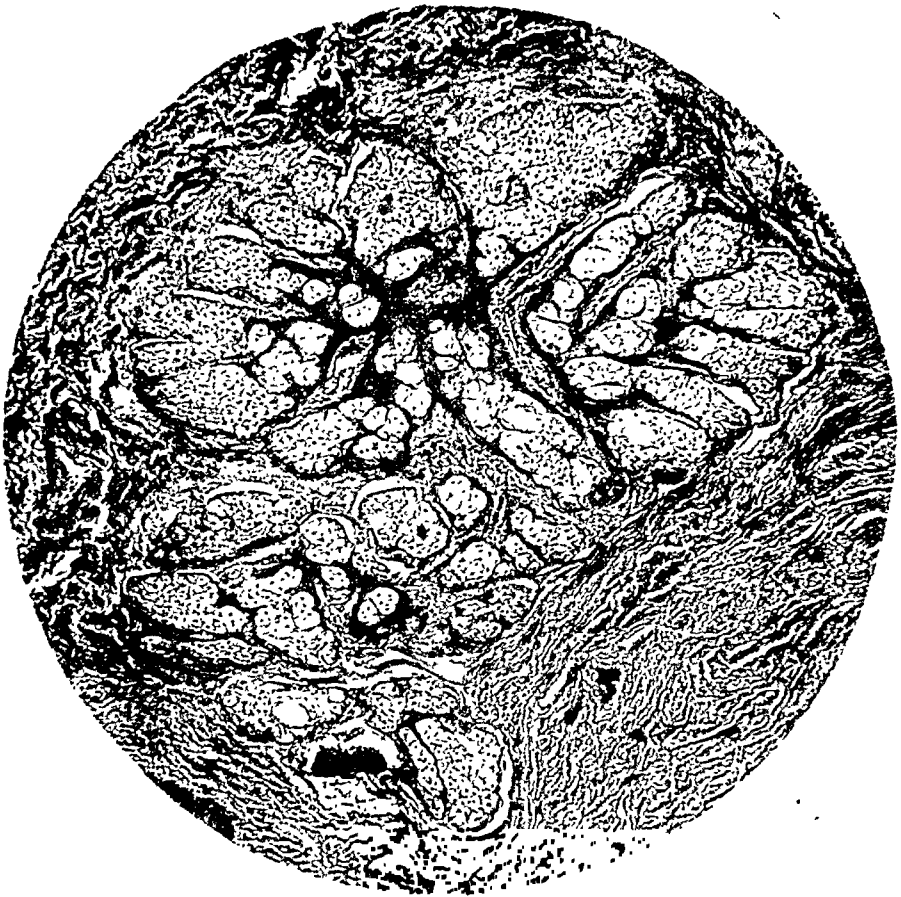


Fig. 3.—Section of a sebaceous gland in the nipple of an adult in the latter part of gestation.

many times its original size (Fig. 3). In one gland thirty-eight saccules were found; many of these, however, were very small and cross-section of the saccule showed from six to twelve cells.

The milk ducts are filled for a considerable distance with plugs which are made up of desquamated epithelial cells (Fig. 4). These cells probably represent the desiccated, flattened, cornified cells of the stratum corneum, as the stratum corneum extends for a short distance inward along the ducts.

The "elastico-muscular" apparatus as described by Liperovsky⁹ although present in all specimens varies in different specimens as to the amount of elastic tissue and smooth muscle.

Finally, it is not unreasonable to ascribe to these structures that are found in the nipple certain features of practical importance. The plugs which are formed in the milk ducts may serve to prevent bacterial invasion of the deeper portions of the ducts and of the glands where, in the resting stage, there is only a single layer of cuboidal

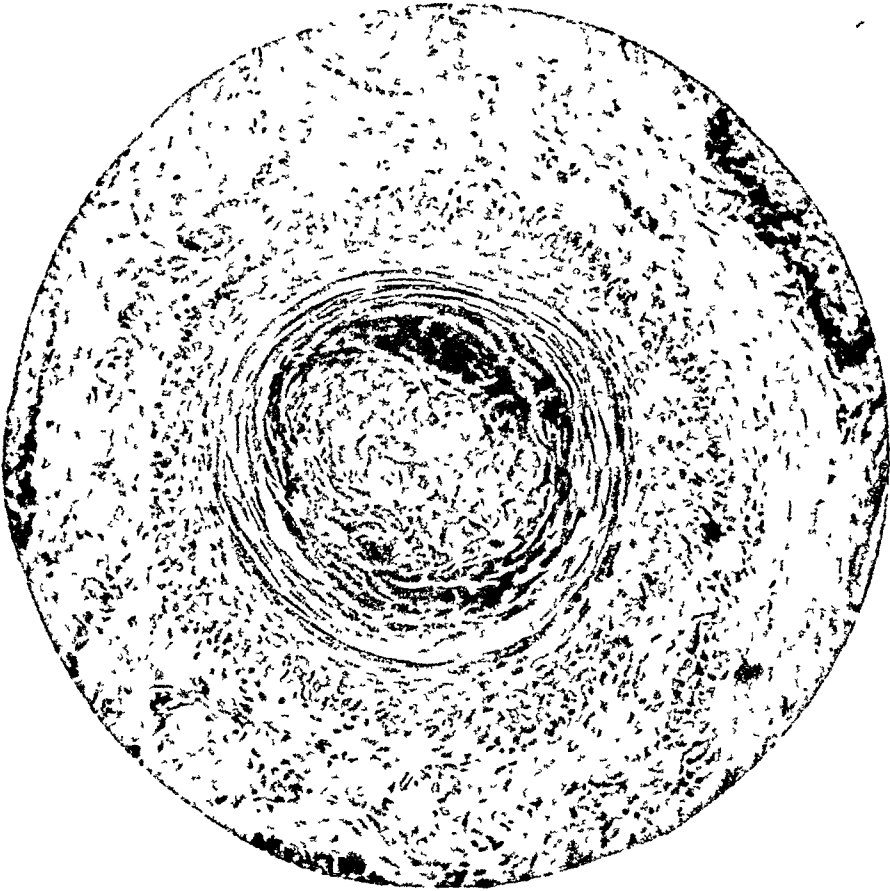


Fig 4.—Cross section of a milk duct in the nipple of an adult female with a resting mammary gland.

cells. The sebaceous glands of the nipple which are *not* associated with hair follicles, may be assumed to represent a mechanism for lubricating the surface of the nipple, as suggested by Piersol and Jackson. During lactation, this lubricating material would probably tend to prevent the drying action of the infant's saliva and of the milk during evaporation, and thus would in the end prevent desiccation of the deeper layers of the corium with resultant cracking of the skin.

REFERENCES

- ¹Jordan, H. E.: Histology, 2nd Ed., 286, New York, D. Appleton and Co., 1921.
- ²Radasch, H. E.: Histology, 2nd Ed., 461, Philadelphia, P. Blakiston's Son and Company, 1924.
- ³Bohm, Davidoff, Iluber: Histology, 2nd Ed., 399, Philadelphia, W. P. Saunders Co., 1914.
- ⁴McMurrich, J. P.: Embryology, 6th Ed., 151, Philadelphia, P. Blakiston's Son and Company, 1920.
- ⁵Bailey and Miller: Embryology, 4th Ed., 413, New York, Wm. Wood and Company, 1921.
- ⁶Jordan, H. E.: Histology, 2nd Ed., 545, New York, D. Appleton and Co., 1921.
- ⁷Piersol: Histology, 10th Ed., 264, Philadelphia, Lippincott Co., 1913.
- ⁸Jackson, C. M.: Morris' Anatomy, 6th Ed., 78, 1921.
- ⁹Liperovsky: Anat. Anz., 1914, xlv, 20.

OUTLET PELVIMETRY AND ITS IMPORTANCE

By C. O. McCORMICK, A.B., M.D., INDIANAPOLIS, INDIANA

(Associate in Obstetric Department, Indiana University School of Medicine)

AFTER what perhaps might be termed a rather limited though diligent obstetric practice, I desire to present some of the impressions I have had regarding the pelvic outlet, based on practical experience and the opinions of modern authorities. I have long wondered why, in our average modern textbook, to a greater degree in our obstetric teaching, and by far a still greater degree in practice, so little stress is placed upon the pelvic outlet compared with the pelvic inlet. The experience of all who have done only a moderate amount of obstetrics and the experience of those who have done enough to compile long lists of reliable statistics, has shown that difficulties arising at the outlet are not only oftentimes equally severe to both mother and baby, but are also many, many times more frequent, and the resulting pathology and permanent injury perhaps ten to one as common as at the inlet. Again, all common measurements of the inlet except the internal conjugate are external, indirect, and inaccurate and of no value except in classifying the type of pelvis, while those of the outlet are direct, easily accessible and accurate as far as exactness is possible. Then, too, the baby's head, which after all is the only real pelvimeter, can be readily applied either manually or by test of labor to the inlet, and the proportions adjudged, but certainly not to the outlet until late in labor, which, indeed, is too late if the outlet proves small.

The normal female pelvic outlet may be considered a true rhomboid, whose transverse and anteroposterior diameters are 11 and 11.5 cm. respectively. For practical purposes it is composed of two triangles, an anterior or urogenital and a posterior or rectal. These triangles have a common base, the bisischial or transverse line joining the ischial tuberosities. The apex of the anterior is formed by the lower

edge of the symphysis while that of the posterior is formed by an equally rigid, fixed point, the tip of the sacrum. The boundaries of the two triangles differ chiefly in that the legs of the anterior are composed of rigid nonyielding bony barriers, the descending and ascending rami of the pubis and ischia, while the legs of the posterior are composed of the soft, yielding parts, mainly the levator ani, coccygeus, the superior and inferior pelvic fasciae, and less immediately the great and small sacrosciatic ligaments.

The diameters of the outlet commonly taken are the transverse, the anteroposterior, the anterior sagittal, and posterior sagittal. It is also customary to note the angle of the pubic rami as narrow, broad, or normal by outlining the rami with the fingers or thumbs. As to the diameters, my experience has demonstrated to my satisfaction

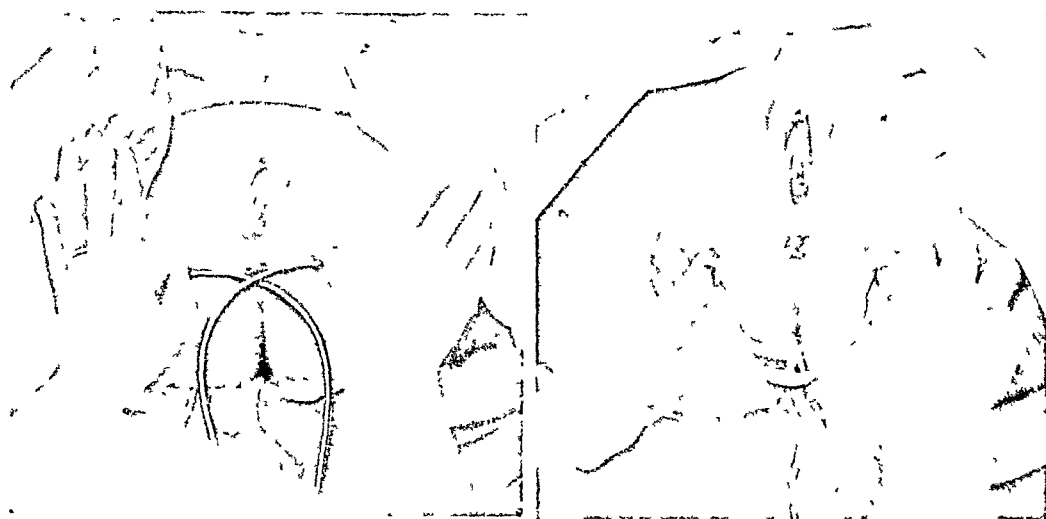


Fig. 1.—Measuring transverse diameter with an inlet pelvimeter.

Fig. 2.—Measuring transverse diameter with Williams' outlet pelvimeter.

that there are but two practical diameters, the transverse or bisischial and the posterior sagittal, first described by Rudolph Klien, in 1895, as that diameter extending posteriorly from the middle of the transverse or bisischial to the tip of the sacrum.

The technic of taking these diameters is as follows: The patient is placed in the exaggerated lithotomy position with the hips well over the edge of the table. This position greatly facilitates measurement because it forces the ischial tuberosities into prominence, and is little short of imperative in order to obtain accurately the posterior sagittal. The patient having been placed in this position, the ischial tuberosities are carefully palpated with the thumbs at the widest transverse diameter. This line will be found to pass transversely across the anterior border of the anus. I wish particularly to emphasize this point, because I find that the average student or the one unfamiliar with pelvimetry almost invariably locates this diameter one or two centimeters anterior to the anus, and thereby gets a reading erroneously short because of the converging rami. Having located the diameter, the thumbs are then so arranged that the planes of the thumb nails correspond to the planes of the inner surface of

the ischial bones. An assistant then measures the distance between the thumb nails with an appropriate pelvimeter (Fig. 1), or the examiner can conveniently perform the measurement alone by employing a special outlet pelvimeter, such as designed by Williams (Fig. 2), or DeLee. He may still more simply perform this maneuver by using an ordinary linen or steel tape stretched against the tuberosities over the thumb ends (Fig. 3). And what is still a more ready, though inaccurate, yet practical method in noting lateral contraction is passing the fist transversely between the ischial tuberosities (Fig. 4). The average fist is 8 cm. wide and if it can be comfortably passed the average head will come through.

The measuring of the posterior sagittal is much less simple, largely because its extremities are decidedly less accessible. The anterior extremity is centrally located on the fixed transverse interischial diameter, while the posterior is represented by the tip of the sacrum. The latter is rather difficult to demonstrate unless the patient's hips are well over the end of the table and the thighs well flexed. With the index finger in the vagina, the thumb is placed over the region of the coccyx. By moving the coccyx back and forth, the sacrococcygeal joint is determined and indicated by marking on the skin with a blue pencil.



Fig. 3.—Measuring transverse diameter with tape.

Fig. 4.—Estimating transverse diameter by passing fist between ischia.

The original instrument devised for measuring this diameter was first described by Klien.¹ The common objection to it and to some of the modifications that followed was that it required an assistant. Thoms' modification is supposed to avoid this objection, and although I am quite familiar with it, and use it altogether, I must admit that an assistant is an added advantage and I believe that so far as the instruments that have been devised up to date are concerned, an assistant is always quite necessary in taking the measurement accurately. An instrument which bids fair to be a one man instrument (Fig. 5) devised by George H. Pierce,^{1a} of New York, has recently come into my possession. The device of Thoms as well as the original of Klien, is so constructed that it may also be used to measure the transverse by placing the thumbs in the hooks and pressing them against the inner surface of the ischial tuberosities. The reading on the crossbar is noted, and then the thumbs are removed and the transverse bar is held in place with the fingers of one hand, while the free compass point is applied to the tip of the sacrum indicated by the pencil mark (Fig. 6). The extent of the measurement is indicated by a scale graduated on a special arm of the fixed leg of the compass. Owing to the thickness of the

sacrum, the reading is over correct by 1 cm., which should be subtracted. The normal net is 7.5 cm.

Some consider the posterior sagittal as measured from the middle of the transverse to the tip of the coccyx, but as pointed out by J. C. Hirst, II,² this is incorrect because the coccyx rarely obstructs labor, and in addition its tip does not lie in the true plane of the pelvic outlet. To obtain the anterior sagittal, the instrument is rotated 180 degrees and the distance similarly measured from the transverse to the lower margin of the symphysis (Fig. 7). This normally is 6 cm.

If one is not equipped with a special pelvimeter he may satisfactorily take this diameter in average cases by placing a tongue depressor or probe along the transverse and measure with an inlet pelvimeter from the middle of the straight edge to the tip of the sacrum (Fig. 8), subtracting 1 cm.; or he may measure from the middle of the straight edge to the tip of the coccyx with either the inlet pelvimeter or ordinary tape (Fig. 9) adding 2.5 cm. to allow for the backward deflexion of the coccyx.

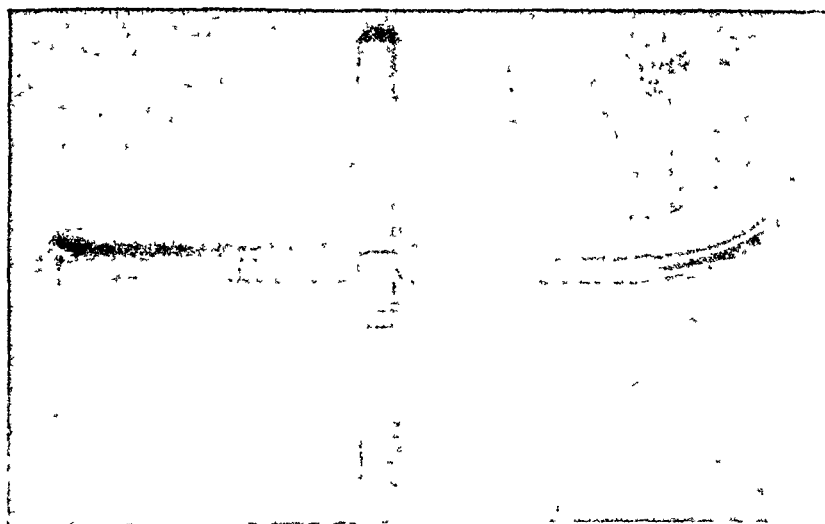


Fig. 5.—Outlet pelvimeter designed by George H. Pierce.

The simple direct manual method described by Edgar has not been found practical, especially where contraction exists. It is performed as follows: Make horizontal pencil marks over the ischial tuberosities indicating the extremities of the interischial diameter. The whole right fist is pressed into the rectal triangle, the ulnar border being carefully adjusted to the sacrococcygeal joint. The upper surface of the index finger or the semiflexed thumb is made by extension or flexion to come in contact with the center of the interischial diameter represented by a straight edge, such as a uterine applicator or heavy probe, joining the horizontal marks over the ischial tuberosities. The fist is then withdrawn and measured with a pelvimeter and the posterior sagittal diameter ascertained. In this instance 1 cm. is not subtracted.

Again, the geometric method of calculating the diameter in question, first suggested by Biddle, may be accepted as satisfactory. Take the square root of the difference between the square of the ischiosacral and the square of one-half the interischial. The result will be the posterior sagittal. Calculation may be avoided by constructing a table, giving both the ischiosacral and the posterior sagittal diameter for each centimeter of shortening of the transverse.

There seems to be a sufficiently constant relation between the distance between the superior posterior iliac spines, ordinarily known as the transverse diameter of the

rhomboid of Michaelis, and the transverse of the outlet to give this relation some practical value. I have found these diameters equal within 0.5 cm. in over 95 per cent of cases measured, ranging from 6 to 11 cm. In other words, a narrow rhomboid of Michaelis is very indicative of a narrow outlet, and a routine prenatal examination should include inspection of this rhomboid. Because in addition, the length of this rhomboid seems to have a definite relation to the conjugata vera—a short rhomboid foretelling a contracted inlet.



Fig. 6.—Measuring posterior sagittal diameter with Thom's instrument.



Fig. 7.—Measuring anterior sagittal diameter with Thom's instrument.

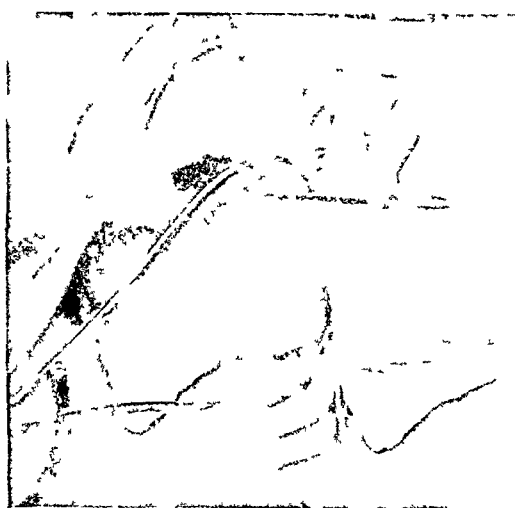


Fig. 8.—Measuring posterior sagittal diameter with straight edge and inlet pelvimeter.

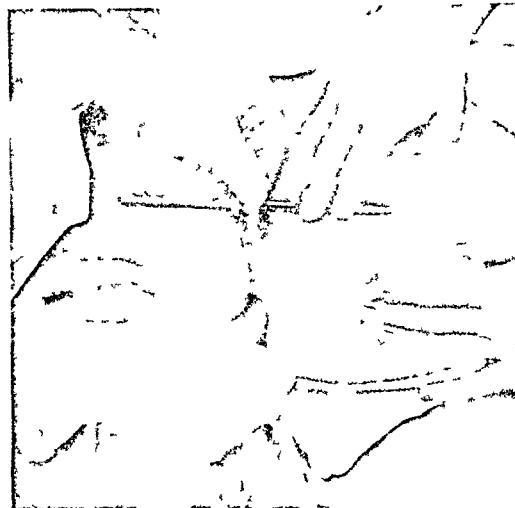


Fig. 9.—Measuring posterior sagittal diameter with straight edge and tape.

It would be unjust not to mention the diligent effort made during the last five or six years both abroad and at home in the field of roentgenology³ as regards pelvimetry, and strangely enough in many instances emphasizing the outlet. The articles are largely technical and appeal chiefly to the x-ray technician. The limitations of this paper do not allow of further discussion except that roentgenographic measurements in women far advanced in pregnancy are unreliable,

and if abnormalities are suspected, especially at the outlet, the examinations should be made early in gestation. Then, too, quite recently a series of cases has been reported by two very reputable authorities,^{3a} questioning the safety of roentgenography during gestation, especially during the early weeks, because of the deleterious effect upon the fetus.

Outlet pelvimetry allows us to recognize the most common pelvic deformity in the American white woman, namely, the contracted outlet pelvis, commonly known as the funnel pelvis. Of all pelvic deformities in the white woman, it constitutes 44 per cent.⁴ This is in marked contrast to 15 per cent in colored women. Its frequency, according to Williams,⁵ Thoms,⁶ and Williamson⁷ is from 5.3 per cent to 7.7 per cent. Without pelvimetry this deformity is usually not found until late in labor, and is the most common cause of outlet difficulties.

This deformity, where outlet pelvimetry is not employed as a routine, is especially liable to be noted in that form of funnel pelvis known as the muscular type, which has been given considerable consideration in recent obstetric literature.^{8, 9} The characteristic, abnormally large inlet measurements together with the muscular make-up of the patient, is quite likely to throw the novice off his guard. He may also overlook the accentuated lumbosacral angle bearing the high promontory which prevents head engagement, and he is liable to be further misled by not taking into account the fact that these patients characteristically give birth to stocky, bony-headed babies. Early recognition in these cases often thwarts disaster to both baby and mother, by calling for early cesarean section.

In contracted outlet the transverse diameter is 8 cm. or less, the arch thus being of the male rather than the female type. In this particular an 8 cm. or less transverse is to an outlet, what an 8 cm. or less conjugata vera is to an inlet, in that both afford warning of probable difficulty.

The prime significance of the narrowed outlet is in the fact that in the normal female pelvis the pubic angle varies from 70 to 100 degrees and usually is a right angle, the occiput rotating under the arch emerges immediately beneath the pubis, the stress of the delivery is borne by the urogenital triangle, while in the narrowed outlet, the occiput is made to escape away from the arch and the head is forced on the perineum and against the coccyx and sacrum, the posterior triangle thus becoming the available outlet. Consequently various degrees of lacerations of the perineum, levator ani, pelvic fascia, and rectum result, with perhaps fracture of the coccyx, and should the sacral tip be far forward, delivery becomes impossible.

In deciding whether the head will or will not pass the outlet, it is

important to know the transverse and posterior sagittal diameters. In general, if the transverse is over 8 cm. no further measurement of the outlet need be taken. However, if it is 8 cm. or less, it is important to measure the posterior sagittal as above described. If the physician is not equipped or does not feel competent, he should, for his patient's sake and his own peace of mind, obtain the help of one sufficiently qualified to make the measurements. This is especially true in cases having a history of previous outlet difficulties.

It often happens that, although the transverse diameter is contracted, the posterior sagittal may be normal, or, indeed, may be of a compensatory extent, thus allowing the passage of a normally sized baby. The compensatory relation of these two diameters as compiled by Williams¹⁰ is as follows:

Transverse diameter 8	cm.	Post. sagittal 7.5	cm.
" "	7	" "	8
" "	6.5	" "	8.5
" "	6.0	" "	9.0
" "	5.5	" "	10.0

A similar analysis of the importance of the relation of these two diameters in contracted cases has been emphasized by J. C. Hirst¹¹ through the formula known as the "Index of the Outlet" devised by C. D. Daniels, of Philadelphia. This index is derived by taking one-half the product of the transverse multiplied by the posterior sagittal; i.e., one-half the base by the altitude. Hirst gives this normally as $\frac{11 \times 10}{2}$ or 55 square cm. This 55 square cm. is called the normal "Index of the Outlet." If this index is 55 to 35, spontaneous delivery is the rule; if 35 to 25 considerable difficulty will be experienced; and under 25, delivery from below is very liable to be insurmountable.

These variations may be graphically given thus:

$$\frac{11 \times 10}{2} \qquad \frac{7 \times 10}{2} \qquad \frac{10 \times 7}{2} \qquad \frac{6 \times 9}{2} \qquad \frac{6 \times 7}{2}$$

Normal index of the outlet, 55,—spontaneous.
 Index down to 35,—possible outlet forceps.
 Index from 35 to 25,—usually forceps.
 Index 25 or below,—practically obstructive.

This formula assumes the normal posterior sagittal to be 10 cm., the same as originally described by Klien, which, to be exact was 9.95 cm. Practically all American clinics find it to be 7.5 cm. It is difficult to reconcile this discrepancy but possibly the German women of Klien's clinic normally have approximately 10 cm. posterior sagittals, for he found a lateral contraction of 24 per cent, which is four times that found among American women.

Of course this index, as well as the table of Williams in general applies to the baby weighing at least 7 pounds and not necessarily to smaller babies. J. C. Hirst, II,¹² reports two cases in which the babies weighed over 6 pounds, the one case having an index of 23.5 and the other 22. Each child survived; in the latter case, however, the baby showed signs of cerebral pressure for a time.

I have found this "Index of the Outlet" very applicable for teaching purposes in that it readily clarifies the subject for the average student.

Neither of these two mathematical guides should be accepted too dogmatically in all cases, because the occasional exception does occur. The ability of a child's head to mold, the position, the *vis a tergo*, and the patient's age are potent factors.

However, I do not believe that a pallid, gasping baby, finally resuscitated, beginning existence with minute hemorrhages permeating its brain, and a mother with a mutilated perineum left to bear the sequelae of disease and discomfort therefrom, constitutes good obstetrics.

It is not within the realm of this paper to discuss the effect of the contracted outlet upon presentation, mechanism, and conduct of labor. Yet it is difficult not to correlate a few practical facts arising from outlet pelvimetry; e.g., if pelvimetry shows a contracted outlet and the baby is of average size, an episiotomy is indicated, when delivery is to be conducted from below. Not only is an episiotomy indicated, but the type suggested; namely, the mesiolateral instead of the median. The median would lead to a possible extension of the tear into the rectum, especially if the size of the baby or the amount of contraction is underestimated. The mesiolateral episiotomy would permit of further extension, if necessary, into the less important tissue of the ischiorectal fossa, and if still further extension of the incision is indicated, it may be continued posteriorly as a concentric incision from 1.25 to 1.5 inches about the anus toward the midline, thus permitting the baby to be delivered *beside* the rectum rather than *through* it. This modification of the mesiolateral episiotomy was first advocated by Schuckart.

Again, the obstetrician, if cognizant of a contracted outlet, is most likely to be prepared to assist with forceps, if indicated, and knowing the situation, is apt to interfere earlier and not permit an unnecessarily protracted labor. His interest in the oversize and presentation and position of the baby will also be stimulated. This early interference may take the form of a pubiotomy or cesarean, depending upon the situation and individual operator. F. S. Newell¹³ in a recent communication reports having seen 3 or 4 cases of ruptured symphysis from the leverage of forceps in endeavoring to work a head

through a contracted outlet. He states further that if the outlet had been carefully measured and the condition appreciated the deplorable accident could have been avoided by selective cesarean.

The accoucher will put a very unfavorable prognosis on a breech presentation and will avoid, if possible, a breech extraction because of the inability to deliver with sufficient rapidity the after-coming head, which not seldom requires forceps. DeLee¹⁴ states clearly that a large number of these babies are lost, if not through forceps, by craniotomy.

For the same reasons the accoucheur, once awakened to a narrowed outlet, most likely will forsake that most commonly used of all emergency operations, the internal podalic version. Large shoulders and extended arms will afford him additional anxiety in both these groups of cases.

Narrow outlet pelvimetry will make the physician skeptical of a posterior position, especially if the head is high when labor begins, even though the transverse is up to 8 cm. He will also realize his handicap in attempting a Scanzoni on these cases. He will assume an unfavorable attitude even in the anterior positions if the head is above the spines when labor begins and the transverse is less than 8 cm. Thus the pelvimetry makes him place a special value on the different positions of the head. Also, if aware of lateral contraction, the conduct of labors complicated by eclampsia, placenta previa, prematurely separated placenta, and other emergency complications, will be governed differently than in normal outlet pelvis.

From the foregoing, it may be conservatively concluded that pelvimetry of the outlet has a most distinct importance in successful obstetrics. I agree with Ehrenfest¹⁵ that too much attention is given to the measurement of the true conjugate and mensuration of the pelvic outlet neglected. As a matter of fact I firmly believe there is more practical obstetrics at the outlet than at the inlet. It certainly is the most important pelvimetry for the general practitioner. As pointed out by Jellinghaus¹⁶—"It is so easy—requires no fuss or pain to the patient. Even if a man were too lazy to measure the posterior sagittal—he could benefit a whole lot by just measuring the transverse."

Because the bulk of obstetrics today is performed by the general practitioner, and the majority of our medical school graduates become general practitioners, and because contracted pelvic outlets with their sequelae are so prevalent, I am of the emphatic opinion that the progress of obstetrics cannot be advanced any more rapidly today than by greatly emphasizing this important subject of outlet pelvimetry in our textbooks and in all our practical obstetric teaching.

REFERENCES

- ¹Klien, R.: *Monatschr. Geburts. u. Gynäk.*, 1895, ii, 165.
- ^{1a}Pierce, Geo. H.: *Internat. Abstr. of Surg.*, February, 1921.
- ²Hirst, J. C., II: *Personal Communication*, Nov. 26, 1924.
- ³Spaulding, A. B.: *Surg., Gynec. and Obst.*, 1922, xxxv, 813.
Weber: *Fortschr. a. d. Geb. d. Röntgenstrahlen*, 1922, xxxix, 20.
Chossard and Lapine: *Jour. Rad. et d'electrol.*, March, 1923, vii, 113.
- ^{3a}Bailey and Bagg: *AM. JOUR. OBST. AND GYNEC.*, May, 1923, v, 461.
- ⁴Williams: *Obstetrics*, ed. 4, p. 823.
- ⁵Williams: *Obstetrics*, ed. 4, p. 828.
- ⁶Thoms: *Am. Jour. Obst.*, 1915, lxii, 121.
- ⁷Williamson: *Am. Jour. Obst.*, 1918, lxxviii, 528.
- ⁸Williams, J. T.: *AM. JOUR. OBST. AND GYNEC.*, April, 1922, iii, 345.
- ⁹Davis, A. B.: *AM. JOUR. OBST. AND GYNEC.*, April, 1924, vii, 373.
- ¹⁰Williams: *Obstetrics*, ed. 4, p. 828.
- ¹¹Hirst, J. C.: *Manual of Obstetrics*, 2 ed., 1924, p. 238, W. B. Saunders Co.
- ¹²Hirst, J. C., II: *Personal Communication*, March, 1924.
- ¹³Newell, F. S.: *Harvard, Personal Communication*, April, 1924.
- ¹⁴DeLee: *Principles and Practice of Obstetrics*, ed. 3, p. 828.
- ¹⁵Ehrenfest, Hugo: *Am. Jour. Obst.*, April, 1906, liii, 465.
- ¹⁶Jellinghaus: *Personal Communication*, Nov. 24, 1923.

504 MEDICAL ARTS BLDG.

THE RADIOTHERAPEUTIC MENOPAUSE: ITS SIGNIFICANCE AND MANAGEMENT*

BY JAMES A. CORSCADEN, M.D., NEW YORK, N. Y.

INTRODUCTION

THE great frequency with which it becomes necessary to bring about an artificial menopause, either by castration or radiotherapy, demands that the causes of the manifestations commonly associated with this state be accurately determined so that its management may be put on a rational basis. This knowledge can be obtained only by observing the patient for at least eighteen months, assuming that the menopause is established when amenorrhea has persisted that long, and determining what symptoms and conditions have really occurred, coincident with the onset of the amenorrhea. The opportunity to make this study has come through the follow-up system at the Presbyterian Hospital which brings back 80 per cent of the patients for personal examination and yields information concerning the general earning capacity and subjective sensations of the patients in over 95 per cent of the cases.

The complete study covers both the castrated women and those treated by radiotherapy. The present discussion is limited to the consideration of the latter: it is a purely clinical study and avoids as far as possible the fascinating speculation as to the mechanism by which the effects are brought about.

*Read at a meeting of the New York Obstetrical Society, December, 8, 1925.

METHOD

The material for the study is taken from the records of 206 patients who have had a radiotherapeutic menopause. The conditions selected for study comprise those which at the present time are commonly associated with the spontaneous "*change of life*" by both layman and physician. The word menopause, strictly speaking, means cessation of menstruation. By tradition and common experience it has come to imply much more; to include a group of diseases, symptoms, and conditions which is constantly diminishing as the real causes are discovered and the need of attributing them to the "*change of life*" eliminated. This group has, in the past, included practically every abnormal sensation and disease; serious diseases such as cancer, Bright's disease, diabetes, osteomalacea and tetany; all sorts of cutaneous manifestations, and nearly all the symptoms referable to the various body systems, notably nervous diseases and insanity; obesity, changes in sex characteristics, premature old age, and latterly many vague disturbances of general health and vitality thought due to disturbances in the endocrine balance.

Our selection has shortened the list to the following subjects, because they are commonly met with in the literature of the normal menopause or are in the minds of most women, particularly when facing the prospect of an artificial menopause: earning capacity, changes in weight, in age appearance and in sex appearance, libido, changes of blood pressure, in the joints, and in the nervous condition of the patient; hot flashes, and other unaccustomed sensations. Of late we have made some observations on the basal metabolism, hoping to throw some light on the question of obesity.

The cases have been divided into three groups, those under the age of twenty-five, to study alteration in physical characteristics in the young; those between twenty-five and thirty-eight years of age, to include the active childbearing period; and those of thirty-eight or over, because this age is commonly regarded as being the normal limit of the spontaneous menopause.

The patients were made either permanently amenorrhoeic by radium or x-ray or were so at the time that the observations were made. This group is small since our policy for several years has been to either give a full sterilizing dose or to avoid the use of radium or x-ray entirely.

GENERAL CONDITION

Explaining the tables concerning the subjects studied we find that the general condition and earning capacity has improved in practically every case because the patients have been relieved of ailments more or less incapacitating. The only exceptions to this general improvement have been six women whose nervous condition has prevented them from

utilizing the physical strength which they possessed. Even sufferers from tuberculosis, being relieved from loss of blood, have increased their activities. The weight has, for the most part, increased a few pounds, an average of six pounds in the cases observed. A few lost weight when their normal exercise was resumed. In only a few instances has there been a great increase in weight. Whatever may be said of the spontaneous menopause, it has not been our experience that obesity has been a prominent symptom arising after the artificial menopause.

The age appearance, as indicated by graying of the hair, wrinkling of and changes in the color and texture of the skin, is obviously difficult to appraise. In only two women of the series have these changes been abrupt enough to be considered as the result of loss of menstruation. This manifestation was particularly studied in the younger women. In them the only difference noted was in the color and texture of the skin which seemed more sallow.

The sex appearance was appraised by noting changes in hair distribution, voice, attitude toward the opposite sex, libido, the breasts, atrophy of the external genitals and vagina, and the size of the uterus. The only change noticed was that almost invariably the uterus, including the cervix, was very definitely and in many cases greatly reduced in size. Libido likewise seemed to be unchanged although the accuracy of the information on this point may be questioned.

Since the publication of Cecil's article on *Climacteric Arthritis*, we have endeavored to note the occurrence of this condition in our women. The information is as yet fragmentary. I feel at liberty to say that the number of women who developed joint symptoms within two years of the induction of the artificial menopause in the series of cases here studied is so small that this difficulty had not attracted my attention as one resulting from the procedure. We hope later to present a more detailed report.

During the past year, we have studied the basal metabolism of 11 patients before and after the artificial menopause. Of these, none has shown a change in the metabolic rate within a year. One as low as 17 per cent minus and another 22 per cent plus have remained unchanged. The greatest change was from plus 6 per cent to minus 6 per cent, both considered normal rates.

Hot flashes have occurred with such frequency that we regard them as a normal manifestation and the one definite indication of the presence of the menopause. The occurrence and severity as indicated in Table I are about the same as one would expect in the spontaneous menopause. It is difficult to determine the nature of the hot flash and the sweats that so frequently go with it. The conventional hypothesis that it is due to irritability of the sympathetic nervous system controlling the terminal blood vessels and sweat glands is satisfactory for the present.

TABLE I
THE SYMPTOMS OF THE ARTIFICIAL MENOPAUSE

	UNDER 25	25-38	38-	TOTAL
Hot flashes				
Absent	3	6	14	23
Mild	6	17	106	129
Severe	1	2	14	17
	10	25	134	169
Nervousness				
Unchanged	4	5	24	33
Improved	4	13	43	60
Mod. severe	1	5	42	48
Severe	1	1	5	7
	10	24	114	148
Age appearance				
Unchanged	5	0	50	55
Older	3	3	14	20
Younger	3	2	2	7
	11	5	66	82
Secondary sex characteristics				
Changed	0	0	2	2
Unchanged	6	32	29	67
	6	32	31	69
Libido				
Unchanged	3	8	25	36
Decreased	1	0	1	2
Diminished	0	0	2	2
	4	8	28	40
Blood pressure				
Unchanged	5	14	63	82
Increased	0	0	16	16
	5	14	79	98

A study of the blood pressure shows that in 16 patients or 19.6 per cent of all the cases observed, there was an increase of over 20 mm. of mercury within eighteen months after treatment. It is interesting to note that all of these rises occurred in women thirty-eight years of age or over. The mechanism by which the increase is produced is difficult to determine. Without having made a careful blood chemistry study in all of the cases, it has appeared that the rise in blood pressure has paralleled the general behavior of the women experiencing it or has been a symptom of kidney disease.

For example, a woman of forty-five was treated because of persistent uterine bleeding which was of a character that suggested the possibility of carcinoma. She returned four months after the operation in a state of considerable agitation with the carcinoma question still unsettled in her mind. Her blood pressure measured 190/90. She was readily relieved of the worry about the carcinoma and because of the high blood pressure was referred for investigation of her kidneys. About three hours after the first blood pressure measurement, after lunching and strolling through the park, she had a blood pressure of 122/85. The elevation in this case was obviously due to her nervous tension. Another case occurred in a woman suffering from a severe anxiety neurosis, who continually haunted the offices of the three physicians who were interested in her, endeavoring to get them to admit that her friends were in a conspiracy to defame her character. This condition of mind had existed for a

period of several years before the operation, and blood pressure taken at that time was sometimes high and sometimes low. Following the operation, the nervousness increased for nine or ten months and with the increase of the mental excitement her blood pressure steadily climbed from 130, postoperative, to 170. As she became calm and more normal in the course of another eight or nine months, the blood pressure dropped and has remained in the neighborhood of 140. A third type of hypertension occurred in the wife of a college professor; their modest circumstances caused her to worry about how to make ends meet and to maintain her position in the college community. She had no particular neurosis but was under a continuous tension. Her blood pressure was 150/100 before operation and has continued high, being 200/140 one year after operation, and 180/115 two years after operation. During this time she had puffiness of hands and feet and turned out to be a definite case of chronic nephritis.

In summary, these observations would indicate that a moderate elevation in blood pressure may occur after the establishment of the artificial menopause in women of thirty-eight or over and that this rise is due more to renal disease or to the general mode of life and emotional state of the individual than it is to the loss of the ovarian substance. This conclusion is reinforced by the experience of Doctor Sharlit; namely, that in hypertension occurring in the spontaneous menopause the use of ovarian extract alone without changing the mode of life and mental attitude of the women has failed to lower the blood pressure more than a few millimeters, although at the same time it has caused a marked diminution in the hot flashes. On the other hand, experimentally, Hoskins and Wheelan¹ were able to show in castrated animals an increased blood pressure response to injections of nicotine.

NERVOUS SYMPTOMS

More important, perhaps, than any of the other symptoms are those referable to the nervous system, because they, of all the symptoms anticipated, are most feared by the patient and most difficult for the physician to understand and relieve.

In a group of 148 cases in whom nervous symptoms were recorded, there were seven cases of serious nervous disorder, all occurring prior to 1921. Of these, five were in women beyond thirty-eight years of age, one at the age of thirty-seven, and one at twenty-three. Forty-eight women were worse off nervously than they were before treatment, but were not disturbed enough to demand serious consideration or treatment, while 33 could appreciate no change in their nervous state, and 60 felt decidedly better.

Of the seven women suffering from severe nervous diseases, two had melancholia, four an anxiety neurosis, one of which was of a paranoid form, and one was an alcoholic. Of the two cases of melancholia, one was insane at the time she was treated although it was unrecognized by us, the duration of the nervous disorder being only determined after she was committed for her insanity. The second case of melancholia was very mild, should perhaps be called merely an exaggerated anxiety neurosis: and occurred in a spinster of forty-five who had never been out of a small

village and was a typical shut-in, protected, and at the same time regarded as a burden by her brothers and sisters. She showed great agitation while under treatment, had an attack of weeping and self-pity during the consultation and during the recovery from the anesthetic given for diagnostic curettage showed a most marked antagonistic anxiety, complaining that hysterectomy had been performed in spite of promises to the contrary. These anxieties increased in number, especially with the beginning of hot flashes. She voluntarily went to a sanitarium for three months. She was later cared for at home, gradually recovered and three years after the induction of the artificial menopause resumed a normal life. In connection with the nervous manifestations occurring in this woman, it is interesting to note that the family of the patient appreciated the mechanism by which the severe nervous state was brought about; the development of abnormal ideas suggested by ill-advised unfavorable predictions on the part of friends and of two physicians. The firmness of their conviction that the psychosis was not due to the artificial menopause and loss of ovarian function is indicated by the bringing of another sister with precisely the same condition (menorrhagia, fibromyoma of uterus) for precisely the same treatment eight years after the first sister had been treated. The woman with alcoholism was treated in the hope that the complete menopause might terminate her agitation. Up to two years after the operation, it had made no difference in her habits.

Of the cases suffering from an anxiety neurosis, one was a woman aged twenty-three, the only young woman so afflicted. She was a moron with the mental age of possibly ten years; she had had several operations to stop uterine bleeding and finally came for radiotherapy. She was amenorrheic for three years. During this time she had hot flashes and many other symptoms, all of which were attributed by her mother, who seemed to have more anxieties than the patient, to the absence of menstruation, including even an attack of duodenitis with jaundice. She begged incessantly to have bleeding restored. She was told that menstruation could not be brought back, but that we could cause bleeding from the vagina. This she asked to have done. Accordingly under local anesthetic a slit was made in the wall of the vagina and some small veins opened which bled with satisfactory profuseness for three or four hours and showed some blood for two days. The patient's complaints ceased for about five weeks and then returned with as great severity as ever. The cessation of symptoms demonstrated that the major part of the patient's distress was mental and that the physical part, for a period as long as five weeks was not sufficient to cause complaint on her part. It also demonstrated the fallaciousness of using a placebo in serious disorders. The other three cases of anxiety neurosis would be described as moderate, except that there was considerable interference with their normal life which required constant management over a period of two years in one case, and five years in another.

The group described as being moderately nervous felt mostly an emotional instability, irritability, and a sense of incompetence. They were anxious about the significance of their multitudinous sensations and attributed them all to the menopause. Some of the women in executive positions, including social workers and nurses in charge of hospital activities felt a loss of power to concentrate. It was difficult to tell whether the lack of concentration was due to any chemical change that may have occurred or whether it was due to the distraction caused by their fears and uncomfortable sensations. These were varied but for the most part were expressed as tingling in the fingers, numbness and an inability to hold small objects, itching in part or all over the body, or sensations of coldness in the hands and feet.

Most interesting is the observation that in 22 per cent of the cases, the nervous condition was unchanged and in 40 per cent was improved, making a total of 62 per cent who were unchanged or better. This is explained by the circumstances under which the artificial menopause was induced. These were sick women. They were worried about cancer; many were anemic and prostrated. The relief from their anxiety, the termination of their hemorrhages with consequent improvement in health and complete freedom to follow their normal pursuits overbalanced the discomfort of the hot flashes and any tendencies toward anxiety neuroses.

TABLE II

SHOWING IN A GENERAL WAY THAT THE SEVERITY OF THE NERVOUS SYMPTOMS RUNS PARALLEL TO THE SEVERITY OF THE HOT FLASHES

AGE	HOT FLASHES	NERVOUS SYMPTOMS				
		IMPROVED	UNCHANGED	MODERATE	SEVERE	TOTAL
16	Absent	1	1	1	0	3
to	Mild	3	3	0	0	6
25	Severe	0	0	0	1	1
25	Absent	1	1	1	0	3
to	Mild	12	1	0	0	13
38	Severe	0	0	4	1	5
38	Absent	5	3	1	0	9
and	Mild	38	29	26	0	93
over	Severe	0	2	7	5	14
Total		60	40	40	7	147

It is interesting to attempt to determine the mechanism which brings about these nervous manifestations when they do occur, for upon such a determination will our management of the problems depend. At the present time there are two schools, the endocrinologists who attribute the disorders to the absence of certain chemicals in the body, and on the other hand the psychiatrists who regard them as of the same nature as other similar nervous disorders regardless of sex, time of life, or state of the reproductive system. That the endocrine disturbance plays some part is assumed because of the frequent molimina accompanying menstruation, such as headache, vomiting, mental depression, and irritability. Also it is common knowledge that many changes in the emotional state, sense of well-being, and general health occur in pregnant women. There is, moreover, abundant experimental evidence of profound effects of castration in young animals, and clinical therapeutic evidence presented by the endocrinologists. Table II showing the relationship of nervous symptoms to hot flashes indicates that the severity of the two symptoms runs more or less parallel. If we take the hot flash as a standard of the menopause, this parallelism might further point toward an endocrine basis for the neurosis.

However, my failure up to 1921 to relieve these symptoms by the administration of ovarian substances, and the greater success resulting

from the application of the principles given below makes it advisable, from the practical standpoint, to discuss these rather than the endocrinologic factor. I will attempt to outline the causes of the neuroses on the basis of their being psychogenic in origin and will take the liberty of stating the principles didactically, my own conclusions from the observation of these cases coinciding remarkably with those of Norberry and Dollear,² Adler,³ Smith,⁴ and Casamajor⁵ upon the neuroses of the spontaneous menopause.

The predisposing causes of an involutional (menopause) psychosis are heredity, preexisting diseases and intoxication, especially syphilis, and especially preexisting evidence of an abnormal nervous make-up (the neurotic constitution, Adler). Without exception, the seven cases of severe nervous disorder here presented had given evidence of a defective nervous constitution.

Next in importance is the development of abnormal mental habits. In women this is particularly easy in matters concerning sex. These are:

Feeling of inferiority of the female sex. (a) Their physical strength is obviously less than that of the male. (b) Emotionally, they are regarded by themselves and in the general literature as weak, gentle, frail, temperamental, vascillating. The very word hysteria implies womb trouble, although it occurred in many of the men who were shell-shocked in the late war. (c) Intellectually they are held in the same regard. Striking evidence of this is presented by the attitude of the community toward the admission of women to the polls. The newspaper and other comment on their activities in intellectual or executive fields implies that they are on trial, that of the males being condescending or amused, that of the females defensive and explanatory. (d) Economically women, outside of the home, have been with few exceptions, up to modern times, employed as menials or attendants except when their sex has been commercially employed; an occupation which in Japan, for instance, has become highly industrialized.

An exaggerated attitude toward the power to reproduce, and its indicator, menstruation. This function has been through the ages the one fundamental possession of womankind; and has determined the attitude of the community toward them. Where there is overpopulation, they destroy the female children as in China where special apparatus is provided for the purpose! There is the baby tower where the highly placed window is so arranged that a mother bringing her child is compelled to push the baby left by her predecessor into the gorge below in order to leave her own to be pushed off by the next mother. In the Pearl River, near Canton, I saw, in 1910, a raft provided for depositing the numerous drowned bodies (nearly all female) making it possible for the police boat to economically collect them in

batches. The practice of suttee in India is based on the same idea. Here a widow, who by custom is prevented from remarrying, burns herself up on the funeral pyre of the deceased. In more modern times and with a desire for more population we see the same attitude expressed in our laws concerning abortion and birth control. Nothing short of impending death or similar catastrophe will justify interference with the biologic process. Neither the personality of the woman nor her effectiveness in other fields is allowed to interfere with the one supreme function.

We are not here concerned with the question of whether the female sex is or is not inferior or with the justice of the treatment accorded them by society, but rather with the question of what is the present attitude of women and the community in general toward this function and how severe a shock the termination of the power to reproduce would be. My interpretations of the expressions of the women who furnish the basis of this study is that it is a very great shock and should be proposed with due regard for its effect on the mind of the woman.

The third mental habit which may lead to a psychosis is the fear of definite symptoms and conditions which are supposed to follow the menopause, especially when artificially induced. They fear (a) a general change in their whole make-up, the advance of old age, obesity, a change in sex characteristics with loss of sex attraction and libido. They also fear (b) diseases common at the time of the normal menopause such as cancer, Bright's disease, hypertension, heart disease, and insanity, and (c) those diseases which frequently become fully manifest after the advent of amenorrhea in a young woman, such as tuberculosis and profound anemia; erroneously believing that the amenorrhea brings about the disease.

THE EXCITING CAUSE

In a woman possessing in slight or great degree a feeling of inferiority, a distorted idea of the importance of the power to reproduce and fear of physical harm from the treatment, the power to reproduce is suddenly terminated. The skipping of the first period after radiotherapy is more or less dramatic, the woman using the words "marvelous," "magical" in speaking of it. The definite sensations, hot flashes, sweats, and paresthesiae constantly remind her that the reproductive function has ceased. She is also constantly reminded of her plight by interested female friends and by physicians who either through negligence or ignorance on the one hand, or because they hold a positive opinion that the loss of the ovarian secretion is the most important cause of the neurosis, cause her to take many medicines and return often to the physician's office for the treatment of her abnormal condition.

The reaction of the woman possessed of an abnormal nervous make-up to this sequence of events is either to become depressed even to a state of melancholia, which is the most common form of involutional psychosis, or to manifest a directly opposite behavior, becoming defensive, over-active and aggressive because of her unwillingness to submit to her fate. These are the old ladies who seek young men as intimates or aspire to a youthful appearance by exaggerated use of prevailing styles in dress, bright colors, cosmetics, hair bobbing, and so forth.

To summarize this conception of the effect of the radiotherapeutic menopause on the nervous system: there is evidence that the loss of endocrine balance is in part responsible for the neuroses. The major cause is believed to be similar to that of psychoses in general: heredity, intoxications, preexisting nervous abnormality, the "neurotic constitution," general sex inferiority attitude, exaggerated attitude toward the importance of the reproductive power, and anxiety over the consequences of the termination of menstruation; all of which tendencies are precipitated by the sudden termination of menstruation and the incidence of obvious discomforts.

The management of the discomforts of the artificial menopause will depend upon the amount of emphasis placed upon either of two opposed principles, one which holds that there is one fundamental chemical disorder underlying all the manifestations; the other which maintains that each of these has its own peculiar causes. In the management of the cases here presented the treatment was carried out from 1913 to 1921 according to the first principle. Patients who had been made amenorrheic by radiotherapy were given some form of ovarian extract when their complaints seemed to demand it. The unsatisfactoriness of the results was indicated by the patients' repeated application for relief. They continued to be distressed, even though possibly relieved of some of the sensory disturbances. Since 1921 the second principle has been followed, that of treating each of the manifestations according to our conception of its causes, irrespective of the element of sex.

It has been found possible to relieve the hot flashes to a satisfactory degree by the use of some ovarian substances but because the discomfort is mostly sensory and because its severity is influenced largely by the nervous condition of the patient, it has become the practice to avoid, as far as possible, the use of ovarian extract and to stress the management of the patient's general physical and mental health.

Hypertension, when occurring subsequent to the establishment of the artificial menopause, has occurred so seldom and has been so moderate that no general policy has been established. When the blood pressure measures over 150 systolic, the patients have been referred to the general medical clinic where they have been treated like other patients

suffering from hypertension, although there also some studies are being made of the effects of ovarian substances.

The paresthesiae have been managed more or less as have the hot flashes, but even less stress has been placed upon the use of ovarian substance.

The nervous manifestations have been managed almost entirely by psychotherapy. The use of ovarian extracts has been carefully avoided. One woman suffering from severe mental depression was refused an artificial menopause because we judged her to be unable to stand the strain of having her sex power disturbed. We have attempted to educate or reeducate women on whom an artificial menopause was to be performed before the act rather than after the nervous manifestations might appear. Taking the cue from the psychoanalysts, we have found that the warding off of anticipated nervous tendencies before they have had an opportunity to begin has been accomplished with a fraction of the effort required to correct them when once established. The patients have been able to assume a reasonable attitude toward the question of sex inferiority, they learn that the power to reproduce, important as it is to the race or the community, has no such importance to the individual. The sensations which are to be expected, particularly hot flashes, are described to them, and, as far as possible, their causes explained so that when they appear there will be no element of surprise, and, lastly, the patient is given a list of those sundry conditions which are likely to be presented to her by her friends as resulting from the menopause and the cause of each explained as far as possible on a rational basis.

CONCLUSIONS

1. The only constant symptom of the radiotherapeutic menopause is the so-called "hot flash."

2. Associated with the hot flash there occasionally occur sensory disturbances, predominant among which are numbness and tingling in the fingers and a sense of stiffness in the hands.

3. A few women over the age of forty appear to have increased blood pressure after the radiotherapeutic menopause; in each case explainable by kidney disease, mode of life, or emotional state. There were no cases in women under this age.

4. Changes in the age appearance, secondary sexual characteristics, and libido have not occurred.

5. Obesity has not occurred with any regularity. The basal metabolic rate has shown no change.

6. Psychic disturbances are rare. The cause seems to be similar to that of other psychoses and not directly attributable to the loss of ovarian secretion.

7. The management of symptoms and conditions following the radio-therapeutic menopause should be based upon general principles rather than upon the theory that they are caused by the loss of the ovarian secretion.

REFERENCES

- ¹Hoskins and Wheelan: Am. Jour. Physiol., 1914, xxv, 119.
²Norberry and Dollear: Illinois Med. Jour., 1918, xxxiv, 77.
³Adler:
⁴Smith: Brit. Med. Jour., 1912, ii, 1378.
⁵Casamajor: Personal Communication.

(For discussion see page 856.)

AN ANALYSIS OF SEVENTY-NINE CASES OF PLACENTA PREVIA

BY BARNARD L. LIEBERMAN, B.S., M.B., DETROIT, MICH.

(From the Obstetrical Service, Providence Hospital)

IT IS the purpose of this paper to present an analytic study of a series of cases of placenta previa as they occurred in a general hospital, where the obstetric work is done largely by general practitioners and a staff of three specialists; the latter being called as counsel in the greater percentage of the difficult cases. What I intend to give here is purely a summary of results which may be used and interpreted as the average in the occurrence of this obstetric abnormality.

The study consists of the cases of placenta previa encountered at our hospital in the last five years. During this period there was a total of 7,928 women delivered, among whom there occurred 79 cases of placenta previa, or a very small fraction over 1 per cent of the total. This average of 1:100 agrees fairly well with the generally accepted statistics. Williams¹ gives the ratio for hospital practice as 1:250. Peterson² states that placenta previa occurs about once in every 300 cases in hospital practice. DeLee³ gives it at 1:1500 to 1:300; Edgar⁴ quotes an average of 1:250. Hitschmann,⁵ quoting the various German clinics, gives the average occurrence as 1:250 to 1:1000. Our average is slightly higher than the others, inasmuch as the percentage of abnormal cases entering the hospital is very high.

As a point of interest, I tabulated the frequency of occurrence as to month and season and found that our cases occurred evenly distributed throughout the various months, there being no seasonal variation.

ETIOLOGY

In our series of 79 cases, there was a total of 306 labors, or an average of 4.033 labors per case. The average number of years of married life was 8.27. This gives an average occurrence of one labor in every two years. Fifteen of these cases were primiparae. This is slightly

above the average statistics. Magyrier at the Baudeloeque clinic found 46.6 per cent among primiparae. These figures have not been generally agreed upon. Doranth, in Chrobak's clinic, gives the incidence of placenta previa as 0.17, 0.48, 1.37, 1.28, and 3.39 per cent according as the patients had given birth to 1, 2, 3, 4, 5, or 6 children respectively.

A distinct history of endometritis could not be obtained in many cases. The incidence of its occurrence may be estimated from the following histories obtained.

Previous instrumental labors.....	19 cases
Closely repeated pregnancies.....	15 cases
Previous puerperal infection.....	2 cases
Previous placenta previa.....	7 cases
Interference from abnormal presentations.....	4 cases
Eclampsia	2 cases

It will be noted that this list includes 43 cases, each having had one or more of the previous abnormalities, a total of 54.43 per cent. Co-

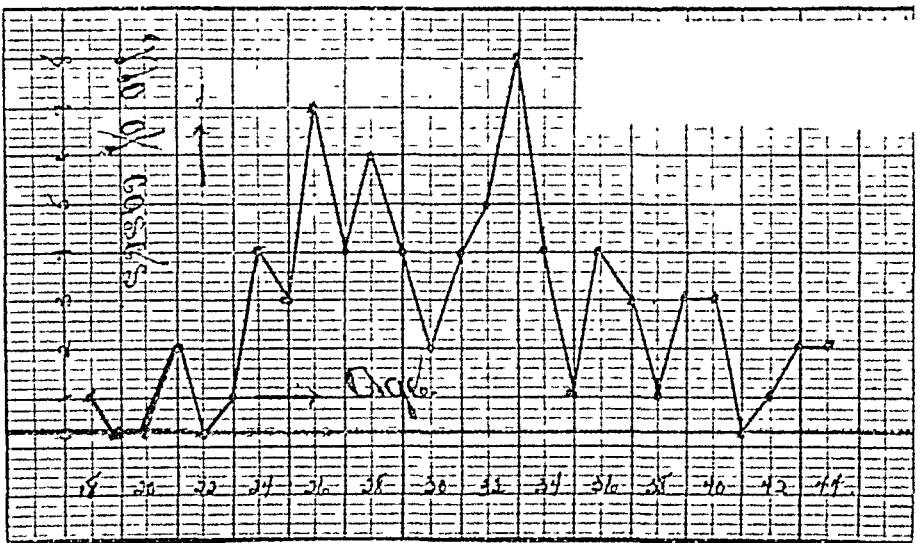


Chart I.

incident with these there was discovered on physical examination a relaxed perineum or a lacerated cervix or both in 45 cases—a total of 56.95 per cent.

AGE INCIDENCE

Strässmann⁴ in his series found that the average age of his patients was 32.9 years, and that the average number of labors was 6.38. This is somewhat higher than in our series, in which the average age was 29.02 years and the average number of labors was 4.033. Chart I graphically represents the ratio of age to the number of cases. The lowest number occur at the period of early married life and near the

menopause. The greatest number occur between the ages of twenty-six and thirty-six. (Chart II.)

TYPES OF PLACENTA PREVIA

The frequency of occurrence of the three types and the maternal and fetal deaths associated are as shown in Table I.

TABLE I

TYPE	CASES	PERCENTAGE	MATERNAL DEATHS	FETAL DEATHS
Central	23	27.848	8	21
Marginal	35	44.303	2	18
Lateral	20	26.583	0	11
Unknown	1	1.266	1	1

Although the marginalis type predominated, the greatest fetal and maternal mortality occurred with the centralis type.

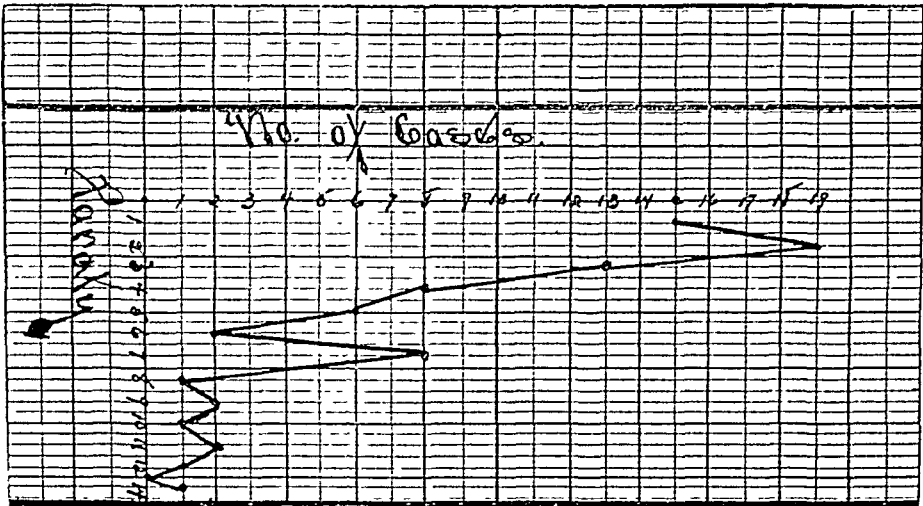


Chart II.

PRESENTATIONS

It is generally recognized that inasmuch as the placenta previa occupies the lower uterine segment, there is an interference with the accommodation of the fetal head with consequent abnormal presentations frequently resulting.

We found the presentations to occur as indicated in Table II.

TABLE II

TYPE	CASES	PERCENTAGE
L. O. A.	38	48.1
R. O. A.	25	31.64
R. O. P.	6	7.7
Unknown	1	1.26
S. L. A.	5	11.3
L. M. P.	1	
R. S. P.	1	
Left breech	1	
Transverse shoulder	1	

There were 9 abnormal presentations or an average of 11.3 per cent. Müller⁵ in his series of 1,148 cases gives the incidence of abnormal presentations as 33 per cent.

HEMORRHAGE

The outstanding and most characteristic symptom, and the symptom which often gives the first intimation of an impending placenta previa, is hemorrhage occurring usually in the last trimester. Among our series, 54 cases gave a history of hemorrhage after the sixth month, or a total of 68.35 per cent. All of the cases gave a history of hemorrhage just preceding entrance to the hospital. In 51 cases, 64.55 per cent, a bloody vaginal discharge was encountered at the first examination on hospital entrance. The degree of hemorrhage and the relationship to the various types of placenta previa is as follows:

Antepartum, profuse	68 cases	86.07%
slight	11 cases	13.92%
Total—100 per cent.		
Postpartum, profuse	9 cases	11.39%
slight	20 cases	25.31%
Total—36.70 per cent.		
CENTRALIS		
Antepartum, profuse	21 cases	26.58%
slight	2 cases	2.53%
Postpartum, profuse	6 cases	7.59%
slight	5 cases	6.33%
MARGINALIS		
Antepartum, profuse	29 cases	36.70%
slight	6 cases	7.6 %
Postpartum, profuse	3 cases	3.8 %
slight	10 cases	12.66%
LATERALIS		
Antepartum, profuse	16 cases	20.25%
slight	4 cases	5.06%
Postpartum, profuse	0 cases	0.0 %
slight	6 cases	7.6 %

It is noted at once that antepartum bleeding was profuse in all types of placenta previa. In one case the hemorrhage history is unknown. Antepartum hemorrhage occurred in 100 per cent of the cases, whereas postpartum hemorrhage occurred in 36.70 per cent. Profuse antepartum hemorrhage occurred in 66 cases, or 83.54 per cent. The relationship of hemorrhage to trauma of the cervix is well illustrated when it is understood that in over 60 per cent of the cases there were definite cervical tears.

FETAL INCIDENCE AS TO SEX AND SIZE

In our series there were 43 males and 36 females. Most of the babes born were premature as indicated by length measurements. (Chart III.)

PELVIC MEASUREMENTS

A study of the pelvic measurements showed that variations are not markedly beyond the normal so that no relationship can be attached to

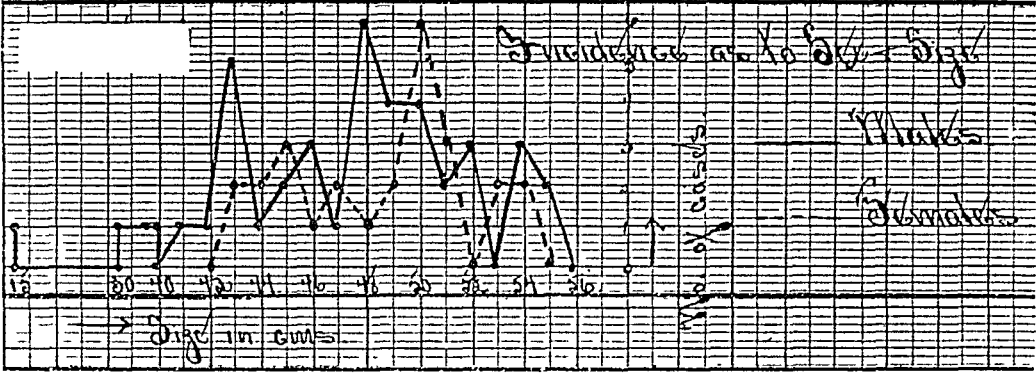


Chart III.

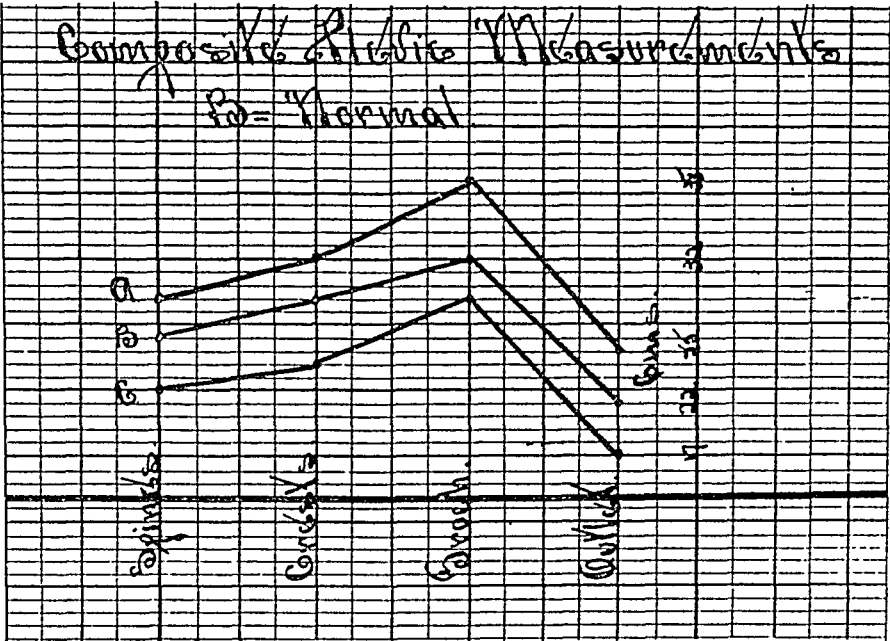


Chart IV.

the pelvic measurements influencing the occurrence of placenta previa. (Chart IV.)

FETAL MORTALITY

Total fetal deaths	51 cases
Absent heart tones before delivery	16 cases
Faint heart tones before delivery	14 cases
Stillbirths	30 cases
including prematures 19, hydramnios 1, and anencephalus 1.	

Cause of Death After Birth

Atelectasis	3 cases
Gastroenteritis	1 case
Anemia	1 case
Prematurity	11 cases
Asphyxia neonatorum	4 cases
Cerebral hemorrhage	1 case
Total	21 cases

The total fetal mortality was 64.55 per cent. Of the 51 deaths, there were 19 premature stillbirths and 11 prematures born alive,—30 cases

or a total of 58.82 per cent. Of the 51 deaths, 30 were stillbirths or 58.82 per cent. Of the 51 deaths, 16, or 31.37 per cent, had absent heart tones before delivery.

MATERNAL MORTALITY

In our series there were 11 maternal deaths, a total of 13.79 per cent. Depken⁶ reports a maternal mortality of 9.4 per cent. Hitschmann⁷ gives the maternal mortality rate of the various European clinics as:

Doederlein,—Bavaria	19.00%
Krönig,—Baden	18.2 %
Mende,—Walzburg	15.0 %
Lefebvre,—Mecklenburg	9.3 %
Chaclaies,—France	15.5 %

Our mortality rate therefore compares favorably with that of the leading clinics of the world. Again it should be remembered that our cases are from a general hospital rather than an individual clinic. Attention is called to Case No. 3 in Table III, which was admitted the tenth day postpartum. No definite history could be obtained. The case was admitted in a moribund condition. Case No. 4 had labor induced by cervical pack followed by version and breech extraction. In this case there were five vaginal examinations made during the course of labor.

The striking point throughout all of these cases was the severity of the hemorrhage.

TABLE III
THE DEATH SUMMARIES

NO.	CAUSE	HOURS P. P.	HOURS IN LABOR	HEMOR- RHAGE	TYPE PLACENTA PREVIA	METHOD DELIVERED	PLACENTA DELIVERED
1	Exsanguination	2	13	Profuse	Centralis	Ver. br. extract.	Spontaneous
2	Exsanguination	1	8	Profuse	Centralis	Ver. br. extract.	Manual
3	Exsanguination	11 da.	?	Profuse	?	?	Spontaneous
4	Puerp. sepsis	72	47	Slight	Centralis	Ver. br. extract.	Spontaneous
5	Exsanguination	4	1	Profuse	Marginal	Ver. br. extract.	Spontaneous
6	Shock	0	45	Profuse	Centralis	Vag. cesarean.	Manual
7	Exsanguination	3	20	Profuse	Marginal	Normal	Manual—torn
8	Exsanguination	1	52	Profuse	Centralis	Ver. br. extract.	Spontaneous
9	Shock	2	9	Profuse	Centralis	Ver. br. extract.	Manual
10	Cerebral embol.	3	61	Profuse	Centralis	Ver. br. extract.	Credé
11	Shock	3	?	Profuse	Centralis	Ver. br. extract.	Credé

In nine out of the eleven cases death followed rapidly after the birth of the child. The degree of shock from the severity of the blood loss was tremendous. The cardiovascular system was so impaired that stimulants and restoratives were useless. The mortality rate was high because most cases were seen late and were very bad risks. In fact, many of the cases were rushed into the hospital in a moribund condition, too late for much to be done.

METHODS OF DELIVERY

Hitschmann⁷ leads the conservative school of Europe and believes in bag induction followed by version and breech extraction. Depken⁶ advocates cesarean section as the method of choice in the best interests of both mother and child. Table IV summarizes the various methods with the consequent maternal and fetal deaths in relation to the number of cases.

TABLE IV

METHOD	CASES	MATERNAL DEATHS	FETAL DEATHS
Version, breech extraction	23	4	15
Cervical pack induction			
Version, breech extraction	8	3	6
Voorhees bag induction			
Version, breech extraction	5	0	4
Braxton-Hick's			
Version, breech extraction	3	0	1
Manual dilatation			
Version, breech extraction	4	1	3
Potter, version	1	0	1
Placenta ruptured			
Version, breech extraction	1	0	1
Normal delivery	13	1	9
Voorhees bag induction			
Normal delivery	3	0	1
Cervical pack induction			
Normal delivery	2	0	1
Bougie induction			
Normal delivery	1	0	0
Membranes ruptured manually			
Normal delivery	2	0	0
Vaginal cesarean section	2	1	1
Classic cesarean section	3	0	2
High forceps	1	0	1
Manual dilatation			
High forceps	1	0	0
Mid forceps	1	0	1
Low forceps	1	0	1
Manual dilatation			
Low forceps	1	0	0
Breech extraction	2	0	2
Unknown	1	1	1
Total	79	11	51

In our series there were twenty-one various methods used, with version and breech extraction the most frequent, and spontaneous normal delivery coming second. However, the first group comprised the more difficult cases; and although the mortality was highest with this method, yet when the relative difficulty of the cases is considered, the method of version and breech extraction was perhaps the most applicable. The Voorhees bag induction followed by version and breech extraction, although used only in five cases, is perhaps the method of choice in the most difficult cases.

PUERPERAL SEPSIS

There were eight cases of puerperal sepsis in this series. It should be remembered that there was considerable manipulation and examina-

tion previous to hospital entrance, and that many of the cases were very poor risks to start with. In the entire total of seventy-nine cases, there were 138 vaginal examinations made, or an average of 1.75 per case. In this group of septic cases which numbered eight, there were 21 vaginal examinations made, or an average of 2.6 per case. Of this group of eight cases there was one death; and it should be noted that this particular patient had five vaginal examinations. Due to the degree of hemorrhage and the condition of exsanguination, these patients are particularly susceptible to infection, inasmuch as the resistance is so markedly lowered. Hirschmann⁷ gives the mortality from puerperal sepsis as 1.9 per cent for hospital practice, and 4.3 for general practice.

Table V lists the cases developing postpartum puerperal sepsis.

TABLE V

DIAGNOSIS	NO. OF VAG. EXAM.	METHOD OF DELIVERY
1. Puerperal sepsis	1	Norm. del.; vag. pack for postpartum hemorrhage.
2. Puerperal sepsis	0	Norm. del.; manual del. of placenta. Vag. pack for postpartum hemorrhage.
3. Puerperal sepsis	5	Cervical pack induction; ver. breech extraction. Patient died.
4. Puerperal sepsis	3	Cervical pack induction; norm. del. Saprophytic infect. of uterine clot.
5. Puerperal sepsis	1	Version and breech extraction; vaginal pack for postpartum hemorrhage.
6. Phlebitis of left leg	3	Breech extraction; vaginal pack for postpartum hemorrhage.
7. Puerperal sepsis	1	Manual dilatation; ver. breech extraction; vag. pack for postpartum hemorrhage.
8. Puerperal sepsis Phlebitis of both legs.	7	Cervical pack induction; membranes ruptured; ver. and breech extraction.

We can attribute all of these infections to excessive manipulation especially in the home under bad conditions.

METHOD OF PLACENTAL DELIVERY

Table VI offers a summary of the manner in which the placenta was delivered and the condition of the membranes.

TABLE VI

METHOD	NO. OF CASES	PERCENTAGE	CONDITION
Spontaneous	31	39.24	1 case torn, but complete.
Manual separation	15	19.00	5 cases torn, but complete.
Modified Credé	13	16.45	1 case adherent and fibrotic.
Credé	19	24.05	3 cases torn, but complete.
Unknown	1	1.26	3 cases torn, but complete. not known.

Hirschmann⁷ in a summary of 2548 cases finds that manual separation of the placenta was performed in 11 per cent of the cases. Out of a

series of 51 cases, Schroeder at the Woman's Clinic of Munich, gives the following as the methods of placental removal.

Spontaneous	5 cases
Credé expressed	16 cases
Manual expressed	26 cases
Previously removed	3 cases
Modified Credé	1 case
Removed per operative wound.....	13 cases

In 12 of our cases the membranes were found to be badly torn. They were complete in all of the cases and adherent and fibrotic in but one case. Our statistics for manual separation are slightly higher than those of Hirschmann, but considerably lower than those of Schroeder.

WASSERMANN REPORT

A Wassermann was taken on every mother on entrance to the hospital. The report on the entire group of cases was negative.

CONCLUSIONS

1. Placenta previa in general hospital practice occurs about once in every one hundred cases.

2. Although no definite etiology can be given, the factors of multiparity, endometritis, closely repeated pregnancies, and recurrent infections are of prime importance.

3. Placenta previa is most apt to occur at the third decade of life.

4. Although the three types of placenta previa occur in about the same proportion, the centralis type carries with it the greatest maternal and fetal mortality.

5. Abnormal presentations are common, occurring in 11.3 per cent of the cases.

6. Hemorrhage is the most striking symptom. All types of placenta previa cause profuse antepartum bleeding. Postpartum bleeding occurs in 36.70 per cent of the cases.

7. The fetal mortality is 64.55 per cent. However, 58.82 per cent of the cases are prematures; and 58.82 per cent are also stillbirths, this tending to raise the mortality rate higher than it really is.

8. The maternal mortality is 13.79 per cent. Exsanguination and shock are the two prime causes of death. It must be remembered that the majority of the fatal cases were bad risks prior to entrance to the hospital.

9. The method of choice for delivery is that of version and breech extraction. This should be preceded by bag induction.

10. Puerperal sepsis can best be avoided by reducing the number of vaginal examinations to a minimum; and also refraining from any manipulation under unfavorable circumstances.

11. Neither syphilis nor the size or shape of the pelvis had any influence upon the causation of placenta previa.

12. Early competent consultation will help reduce both the maternal and fetal mortality rates.

NOTE.—I wish to express my thanks to my chief, Dr. W. E. Welz, for his many suggestions and criticisms.

REFERENCES

- ¹Williams: Obstetrics, New York, D. Appleton and Co., 5 ed., 1923.
- ²Peterson: Textbook of Obstetrics, Philadelphia, Lea and Febiger, 1907.
- ³DeLee: Textbook of Obstetrics, Philadelphia, W. B. Saunders Co., 3 ed., 1920.
- ⁴Strassmann: Placenta Previa. Arch. f. Gynäk., 1902, xxxvii, 112-275.
- ⁵Müller: Placenta Previa, Stuttgart, 1877.
- ⁶Depken: Zentralbl. f. Gynäk., Feb. 16, 1924.
- ⁷Hitschmann: Die Therapie der Placenta Previa, Berlin, 1921.
- ⁸Edgar: Practice of Obstetrics, Philadelphia, P. Blakiston's Son and Co., 5 ed., 1916.

THE PROTECTION OF THE PERINEUM

BY ANTONIO VILLARAMA, M.D., MANILA, P. I.

(From the Philippine General Hospital)

THE purpose of this paper is to relate observations and studies made during the past five years on the protection of the perineum. The points that have been considered to play an important rôle in the preservation of an intact or nonlacerated perineum are the following: (1) anatomy of the vulva and perineum, (2) age of the patient, (3) the angulation of the pubic arch, (4) size of the fetus, (5) previous injuries to soft parts and subsequent formation of scar, (6) presentation and position of the fetus, (7) the use of general anesthesia, and (8) the intervention performed.

The anatomy of the vulva and perineum.—The classical description of the vulva and perineum may be found in the textbooks of general anatomy. It is important, however, to point out different degrees of development of the vulva in regard to adipose and muscular tissue. The presence of edema and varicosities and of too much fat is important. Again the distance from the fourchette to the anal opening should be taken into account; thus we may differentiate between a high or a low perineum. Personally, I call a perineum high which measures from one and one-half to two inches, and low one that measures less than one inch. The low perineum is the more frequent, being observed in 217 cases out of 257 in this series.

The age of the patient.—The ages of our patients varied from thirteen to forty-six years, both primiparae and multiparae. The youngest primipara was thirteen years old and the oldest, thirty-eight. The tissues of younger individuals have a higher degree of elasticity than those of the older.

The angulation of the pubic arch.—As bone diseases are very seldom met with in the Philippines, acute angulation of the pubic arch is rare. When it is present, as in two of our cases, the transverse diameter of the pelvic outlet becomes narrowed, being 8.75 cm. in one and 9.25 cm. in the other. A wider angulation obviously affords more chance for the perineum not to be lacerated.

The size of the fetus.—The largest babies I have delivered weighed 4,280 and 4,000 grams respectively, both born of multiparae. The latter caused a very deep perineal laceration, though the patient had an old tear; while the larger one did not even produce injury of the fourchette. This can be explained by the fact that the mother of the former baby was smaller than that of the latter, also because her vulva was flat, having no well developed muscular and adipose tissue.

Previous injuries to the soft parts and resulting scar formation.—A badly repaired perineum is predisposed to laceration on subsequent deliveries. Badly repaired is a perineum in which it is seemingly restored but which is not supported from beneath by good union of the muscular and fascial tissues. The slight trauma produced by a descending head is enough for this kind of perineum to give way. Again there were repaired perineums observed in which there was good union of muscular and fascial as well as of mucosa tissues but in which the edges of the laceration were not properly united. In such cases, during subsequent delivery, the dilatation of the perineum and labia will not be uniform and the part subjected to a higher degree of tension is predisposed to tear. The scars formed after perineal laceration are, as a rule, not extensive unless the lacerations were deep or had become infected. In this connection I would like to mention two cases of extensive cicatricial tissue around the vulva. One of them, produced by a large burn on the vulva and vagina, extended above the level of the symphysis laterally into the inguinal regions and downwards to the anus. The external genitalia represented a keloid mass causing an almost complete atresia of the vaginal orifice. When the nurse called for me she told me that there was a patient delivering through the anus, evidently the anal opening being more dilated than that of the vagina. Those familiar with obstetric practice in the Philippines cannot fail to know that so extensive a keloid could only be accounted for by our "saklab" practice by which the puerpera in the fourth week shuts herself in a well-closed room and sits above a red-hot iron or an elongated stone which, by dropping water or vinegar on its surface, generates a good amount of smoke. Undoubtedly this woman, by mistake or by loss of equilibrium, flatly sat upon it. The other case of extensive cicatricial tissue formation was a para ii, attended by a "hilot." The perineal tear must have been extensive, unrepaired, and infected.

Cicatricial tissue ran along both lateral vaginal walls and in the median line just above the anus. The vaginal orifice was very much reduced in size.

The presentation and position of the fetus.—The majority of our cases were vertex presentations, but we had three face, one brow and three shoulder presentations. The position and presentation of the fetus and its mechanism must be well understood by the attending physician, both for a normal labor and for performance of any obstetric operation, especially a forceps extraction.

The use of general anesthesia.—Chloroform and ether were invariably used in this series. The patients were not completely anesthetized unless instrumental delivery, podalic version or breech extraction was to be performed. The purpose of giving anesthetics is to relax the entire muscular system so that also the best results will be obtained so far as the preservation of the perineum is concerned.

The intervention performed.—Obstetricians always realized the importance of perineal protection. Some older accoucheurs introduced fingers into the anus to lift the head upwards. Later, episiotomy was introduced and an incision was made when the laceration seemed imminent. This operation now is very popular, a practice with which I cannot agree. In this series the methods of deliveries were as follows: spontaneous 197, forceps 51, breech extraction 6, podalic version 3, episiotomy 2, hebeostotomy 1, craniotomy 1.

In the beginning of my practice I confined myself to the Ritgen method. During a contraction the patient is asked to open her mouth so that she cannot bear down and the baby then is delivered in the interval between two contractions. I used routinely a few drops of chloroform to obtain merely an analgesic effect so that the patient could be given instruction and would cooperate during the perineal stage. Cooperation on the part of the patient during this stage is just as important, if not more so, than the part played by the physician. I have found that very strong pressure against the advancing head is a disadvantage. The important point is merely to give proper support to the perineum in such a way that the tension and distention of the perineum become more evenly distributed. To do this it is of prime importance not to use force or pressure which is greater than that of the descending head, or inevitably the section of the perineum between the head and the hand will be crushed and must tear. Following this line of reasoning, I have allowed the head to dilate the perineum gradually and when the parietal bones are in sight, a few drops of anesthetic are given during the acme of the contraction, at the same time care being taken to have the entire vaginal orifice dilate slowly by gently pushing back its edges over the head. It is necessary to delay expulsion for at least ten minutes

to obtain an intact perineum. DeLee states that as the result of our desire to preserve a perineum, we might deliver an asphyxiated or stillborn baby. He is partly right and I agree that in prolonged labor, where the fetus invariably suffers, and in other cases in which the fetus is likely to be asphyxiated or dying, it is necessary to do a rapid extraction without special regard for the perineum. In endeavoring to preserve the perineum it is important for the attending obstetrician to be very patient. The procedure entails for him careful and continuous work, and for the parturient prolongation of her suffering. An analysis of our spontaneous deliveries shows: Total number of cases 197, lacerated, second degree 35, lacerated, first degree 16; no laceration 146; fetal death 2. Almost 70 per cent of our cases were delivered without laceration. Williams states that two-thirds of the primiparae and 10 per cent of the multiparae sustain lacerations during delivery. In our cases there were only three multiparae, one having a badly repaired perineum and the other two having big babies.

The breech extraction and podalic version cases were all primiparae. Of the nine cases, two had a second degree laceration, four first degree, and three remained without any laceration. In one of the shoulder cases there was one stillborn child, dead before the podalic version was performed. The other two cases of shoulder presentation were brought to the hospital immediately after the prolapse of one arm. The cord in both cases did not suffer from compression. Episiotomy was performed only in the one patient with the extensive keloid of the external genitalia from a burn and the other with extensive scar formation. In the keloid case incision at the median line downwards was found not to be sufficient, so another incision to the left side laterally upwards had to be made to deliver the baby. The patient had fever for one week before labor started and she died from sepsis the following day. In the case of extensive scar formation, after splitting the bands along the lateral wall of the vaginal canal, another short incision was made in the median line. Low forceps was then applied. The hebeosteotomy and craniotomy cases were two primiparous women having pubic arches with acute angulations. The first patient entered the hospital after premature rupture of the membranes. The fetus was alive. In the latter case the fetus was macerated. In both cases second degree perineal tears occurred in spite of the enlargement of the pelvic dimensions in the one case and reduction of the head in the other. The weight of the living baby was 2,910 grams, well within the normal limits of Filipino babies. At present I feel that in a case of narrow outlet with a somewhat overdeveloped baby we should give preference to abdominal section,

especially if the hebeosteotomy is likely to cause a dangerous gap of more than two centimeters.

The first application of low forceps that I performed was in a multipara with almost second degree old healed perineal tear, which I lacerated further in my operation. The second was again on a multipara who was not put under general anesthesia because she was a tuberculous patient. This time I did not further lacerate the perineum. The fault in the first case was too rapid extraction, believing that the fetus would suffer too much, and some nervousness of the beginner. During the last two years I have learned that application of a low forceps offers the best means of delivery for a primipara. It not only enables us to protect better the perineum but also to shorten and lessen the pains of the second stage. By putting the patient under complete anesthesia we cause all tissues to relax and we can make slow tractions. The vaginal wall and perineum thus are dilated gradually and undue tension is avoided. Finally the edges of the vulva orifice are carefully pushed over the head. The expulsion of the head is entirely controlled by the operator.

Of the 51 cases of forceps extraction 6 sustained a second degree and 10 a first degree tear; the rest, 35, did not have any laceration. There was no fetal death among them. All tears were properly sutured and found well coaptated after healing.

The importance of a good perineum after childbirth cannot be overemphasized. Most of the uterine displacements and prolapse seen in the Philippines are chiefly due to relaxation of the perineal floor and the custom of early return to the daily work. The best prophylactic measure, therefore, is avoidance of tears. My own results prompt me to advocate the application of low forceps both for shortening the second stage and as a better means of protecting the perineum, especially in the presence of a high perineum. Forceps application also can be advised as a means of relieving greatly the patient's suffering.

THE VOMITING OF PREGNANCY, ITS CAUSATION AND ITS TREATMENT BY OVARIAN EXTRACT*

BY PHILIPS J. CARTER, M.D., F.A.C.S., NEW ORLEANS, LA.

INDIFFERENCE to the vomiting of pregnancy by looking upon it as a natural physiologic consequence of the pregnant state has led to many catastrophes. That the pregnant woman must vomit, a theory casually accepted by many physicians, is erroneous, for statistics prove that some two-thirds do not, though why some endure the ordeal and others escape is still an unsolved problem. Whatever the facts, however, the condition should never be looked upon as purely physiologic, but should be treated as pathologic from its inception.

Theories are constantly being advocated as to its causation, and they are so numerous that, as one writer says, "It would be a useless task to detail at length the theories which have been advanced to explain the disease. Indeed, it may safely be held that the supposed necessity of providing a theory which would explain all the facts of the condition has done more to surround it with obscurity than even the difficulties of the subject itself. If any real advance is to be made, it can only be by adopting a humble attitude, by admitting that we are only on the threshold of the inquiry, and by a careful observation of the clinical facts, without drawing from them too positive deductions."

It is not my intention in this brief paper to outline all the theories and treatments which are advocated in connection with the vomiting of pregnancy, but to deal only with those which have seemed to me to be most reasonable. The three theories which are possibly the most popular, the absorption theory of the products of gestation, the endocrine theory, and the metabolic disturbance theory, like many others, seem to show the effect and not the cause of the pathology, and if any of them is eventually to be accepted as the explanation of vomiting of pregnancy, it will only be when more conclusive investigations have been done than are at our disposal at present.

The simple nauseas of pregnancy, without vomiting, may be due to various factors, neuroses of various types, displaced uteri, cervical erosions, adhesions, even constipation. This type is frequently checked by simple, suggestive measures, such as gradual dilatation of the cervix, replacing a displaced uterus, or local treatment of a cervical erosion, and the success of such measures would seem to prove that the condition is not essentially a pathologic one. When the discomfort passes beyond this state, however, and the vomiting becomes more than the familiar "once a day, early in the morning type," then we are

*Read at a meeting of the New Orleans Gynecological and Obstetrical Society, January 14, 1926.

dealing with a pathologic condition, and as such we must look both for the etiology of the disease and for some successful method of combating it.

To glance briefly at some of the theories which have been advanced to explain the vomiting of pregnancy, Bourne of Great Britain contends that a toxin is constantly being produced by the growing ovum during pregnancy and is absorbed by the maternal circulation, so that the ovum constantly poisons the mother, but that in all healthy mothers most of the toxin is effectively counteracted by their own immunizing efforts. Schmoll definitely proved that foreign fetal protoplasm was conveyed into the maternal circulation when he demonstrated the presence of small pieces of syncytial protoplasm in the circulation, and he agrees with Bourne that a biologic defence is set up by the maternal tissues to battle the invasion.

Abderhalden demonstrated that the maternal blood contained a specific ferment capable of digesting placental protein, while Theis and Lackemann demonstrated the sensitization of maternal serum to that of the fetus, and also that of the placenta. Young demonstrated this experimentally with postmortem findings identical with those of eclampsia.

Williams quotes Veit in a rather plausible theory, to the effect that in normal pregnancy varying amounts of fetal ectoderm and even fragments of chorionic villi are constantly becoming separated from the placenta and gain access to the maternal circulation, the process being designated as "deportation." Veit contended that the fetal elements give rise to a poison, which he calls syncytiotoxin, which is normally rendered immune by a supposititious antibody, syncytiolysin, which develops in the maternal serum. If, however, for any reason the former is present in quantities too great to be neutralized, or if the elaboration of the latter is interfered with, symptoms of poisoning result and toxemia eventually follows.

Hofbauer emphasizes the fact that the pituitary and suprarenal glands play an important part in the pathogenesis of pregnancy, and adds that the hormones from these glands affect the brain, kidneys and stomach. He therefore considers ovarian extract almost a specific for this pathology, claiming that it inhibits the action of the pituitary and suprarenal glands on the sympathetic nervous system, but paralyzes the excessive functioning of the pituitary-suprarenal system, and, reasoning along the same general lines, he prohibits the employment of morphine and pituitary extract.

Ingenious as are these theories, and numerous others which we might mention, it is obvious that they are still open to attack from various angles, and that, until a more satisfactory explanation is advanced, we must continue to treat vomiting of pregnancy exactly as we have in the past, empirically and almost in the dark. No matter what ex-

planation we accept, however, one point is clear, that prevention of the disease is better than its attempted cure. The maternal organism is already under a definite strain, and any pathology, no matter how slight, adds further strain, so that disaster may result unless effective methods are employed as soon as possible. This cannot be too much stressed because of the treacherous nature of the disease. It is apparently a simple, unimportant matter, the response to simple measures is usually good, and too many women are themselves prone to accept it as the inevitable consequence of their pregnant state. Often, almost before it is realized, a grave pathology has arisen from what was originally considered a minor discomfort. To prevent the simple from becoming the complex by careful watching and by treating the condition in its incipiency, especially in the nausea stage, should therefore be the criterion of any system of treatment which is advocated.

For approximately ten years I have been particularly interested in this condition, and have evolved a plan of treatment which has given me almost uniformly good results. For purposes of convenience I have considered three types of cases, depending upon the gravity of the condition: first, mild cases, those who gag and are slightly nauseated, or who vomit occasionally; second, moderately severe cases, those who are frequently nauseated and who vomit several times a day; third, severe cases, those who ultimately develop pernicious vomiting. In all types the treatment is based upon the use of ovarian extract, the administration varying according to the classification of the disease.

In the mild cases 5 gr. tablets of ovarian extract (whole ovary) are given every three hours until the symptoms cease. The patient is instructed to take only liquids until the nausea passes, after which solid food is taken as desired. If there is no response to this treatment, the patient falls under the head of the moderately severe type, and is treated accordingly, so that the treatment in any individual case may vary from that given in the mild to that given in the severe type.

In the moderately severe type the same treatment is again used, but the ovarian extract is given in ampule form by hypodermic. One cubic centimeter is given daily until the nausea and vomiting have ceased, after which the treatment is continued for another week. This last point is rather important; in my earlier cases I found occasional patients who would stop vomiting for several days and then would begin again. Apparently the system was not sufficiently saturated with the ovarian extract, for in every instance the additional dosage checked further trouble. Each cubic centimeter of ovarian extract in ampule form contains the water-soluble active bodies from 30 gr. of whole fresh ovary.

In the severe type the treatment consists of hypodermic injections of ovarian extract in conjunction with hypodermic injections of phenobarbital sodium (luminal sodium). The patient is kept in bed; nothing

is given by mouth; glucose is administered per rectum, and hypodermoclysis is given according to the indications of the individual case. One c.c. of ovarian extract is given every two hours, and 1 gr. of luminol sodium every three hours, both by hypodermic. This treatment is continued for forty-eight hours. If at the end of that time no improvement is observed, glucose and insulin are given according to the methods of Titus and Thalheimer.

In a previous paper, published in 1917, on the treatment of the vomiting of pregnancy with ovarian extract and corpus luteum, I reported 20 mild cases with 100 per cent relief. Since then 20 more cases have been added to this group. In three of these the treatment failed entirely, but through eliminative measures the patients were carried to full term. Three others aborted spontaneously.

In the moderately severe classification there are 26 cases, with four failures. Two of these responded to treatment by hypodermic injections of luminal sodium and went to term. One responded to eliminative measures, and one required a therapeutic abortion; details of this case are given in the appended reports. Another patient aborted as the result of an overdose of paregoric. The dosage in this series ranged from 2 to 38 ampules in daily doses of 1 ampule. Twenty-three of the patients required from 2 to 12 doses, and three from 24 to 38. Recently I have used the tablet form of luminal sodium in six cases of this type, with one failure; this patient later responded to three 1 c.c. injections of ovarian extract over a period of three days. The luminal sodium was administered in half grain doses three times a day, thirty minutes before meals.

The severe type, leading to pernicious vomiting, is discussed in the appended case reports.

In justification of this mode of treatment, which in my hands has given satisfactory results, I would advance the following experimental data: Dixon tells us that the injection of ovarian extract causes an immediate secretion of pituitrin into the cerebrospinal fluid, and in a more recent article he and Marshall have shown that the presence of a corpus luteum of pregnancy inhibits the activity of the ovary, but that before parturition begins there appears to be a sudden rush of pituitrin into the cerebrospinal fluid, which, entering the circulation, helps to empty the uterus and to start the flow of milk. From this it seems to me justifiable to assume that the hormone from the ovary may at times reach an excess, throwing more pituitrin into the organism and therefore producing some of our obscure abortions. It is likewise reasonable to assume, on the contrary, that there are some instances in which the ovary fails to produce a hormone, no pituitrin is secreted into the cerebrospinal fluid, and as a result a toxemia follows, which may be neutralized by saturation of the patient with ovarian extract.

CASE REPORTS

CASE 1.—Para i, aged thirty-one years. First consultation five weeks after a missed period, for acute ptialism. Two days later nausea and vomiting occurred simultaneously. Treatment in this instance was extremely difficult, as the patient was a working girl, and, contrary to my advice, she insisted on continuing her work. I gave her ovarian extract in ampule form over a period of thirty-eight days, but without much benefit; she was able to take small amounts of liquid nourishment, but continued to vomit several times daily. At the end of this time she was so weak that she was obliged to follow my advice and give up her work. Vomiting was so severe and frequent that she could retain nothing by mouth. She was admitted to the hospital and the routine treatment begun; nothing by mouth, a continuous glucose drip, and absolute rest. She was given 1 gr. of luminal sodium every three hours and 1 c.c. of ovarian extract every two hours, both hypodermatically. At the end of twelve hours she showed considerable improvement, whereupon the ovarian extract was discontinued, and the luminal was given three times a day. At the end of twenty-four hours the vomiting had stopped entirely, and she was put on soft diet. She remained in the hospital ten days, because of her weakened general condition, during which time the luminal was continued. Her pregnancy thereafter was uneventful.

CASE 2.—Para ii, aged twenty-six years. First pregnancy normal. I saw her in consultation at the end of two weeks of practically continuous vomiting, so severe that even water could not be retained. Her physician had given her ovarian extract by needle once a day during this entire time, with no perceptible improvement. When I saw her she was delirious, dehydrated, with drawn facies and pinched nose, and vomiting blood. The temperature was 101 and the pulse 120. Therapeutic abortion was advised, but for religious scruples was immediately refused. Everything was thereupon withdrawn by mouth, a continuous drip of glucose and soda bicarbonate was instituted, ice caps were applied to throat and abdomen, and hypodermoclysis was given every four hours. In addition she was given 1 gr. of luminal (crystal) every three hours and 1 c.c. of ovarian extract every two hours, both by needle. Twelve hours later the vomiting was checked, and nourishment was taken in small amounts. Active treatment was continued as above, except that hypodermoclysis was stopped. At the end of seventy-two hours all treatment was withdrawn except the hypodermic medication, which was continued three times a day. The patient was normal on the fourth day and allowed to be up on the fifth, the hypodermic medication being continued three days longer. A mild recurrence of the vomiting ten days later was easily controlled by daily injections of luminal sodium and ovarian extract. Further pregnancy without incident.

CASE 3.—Para v, aged twenty-five years. First three pregnancies accompanied by nausea but no vomiting. Fourth pregnancy terminated in therapeutic abortion, because acute yellow atrophy of the liver developed in spite of treatment by elimination and ovarian extract in hospital. In this, her fifth pregnancy, nausea and vomiting developed simultaneously and could not be controlled, although ovarian extract and luminal sodium were given by hypodermic over a period of a month, three times each day. Eliminative and constitutional measures were also employed, without effect, and hospitalization, with infusions of glucose and insulin likewise failed. When characteristic urinary findings developed and she began to turn quite yellow, the condition was so obviously a beginning recurrence of her previous malady that I considered further delay dangerous, and therapeutic abortion was therefore done at once.

CISTERN PUNCTURE IN INTRACRANIAL BIRTH INJURIES

BY BERMAN S. DUNHAM, M.D., TOLEDO, OHIO

(*Pediatrist to the Maternity and Children's Hospital*)

THE value of cerebrospinal drainage in the diagnosis and treatment of intracranial birth injuries is admitted by most authorities. In a consideration of this subject, certain features of the pathology and the disturbance of function should be noted.

The usual lesion is an intracranial hemorrhage. Edema of the brain may be an important complication, however; or at times it may be the only finding. Vital disorders are due most frequently to an intracranial pressure from hemorrhage or edema. Sometimes traumatic shock and depletion of the general circulation from bleeding within the cranium are important factors in the morbid condition.

Hemorrhages are located most frequently in the subarachnoid spaces over the cerebral and cerebellar surfaces. The source of the bleeding is usually from torn meningeal vessels or from lacerated sinuses or their tributaries, in association with tears of the tentorium or falx, incident to labor.¹ Intraventricular hemorrhages from lesions of the choroid plexus, as well as localized epidural hematomata in association with fractures of the cranial bones, occur infrequently.

The wall-like function of the tentorium, which separates more or less completely the cerebral from the lower subarachnoid spaces, has an important bearing on the location of a hemorrhage in respect to treatment.

THERAPEUTIC AND DIAGNOSTIC CONSIDERATIONS

The earliest attempts at relief from hemorrhage and pressure were made by the use of decompression. Death usually followed, due apparently to the multiplicity of the vascular tears, the impossibility of locating and repairing them, and the conversion of the closed subarachnoid space into an open one with a total release of pressure at the bleeding points. Later, it was found that lumbar puncture offered a means of control of the pressure within physiologic limits in many instances until the bleeding stopped spontaneously, with a record for recoveries far better than that from decompression. Decompression, however, may be the only hope for relief in lesions above an intact tentorium and inaccessible, therefore, to drainage from below.

Many babies with intracranial hemorrhage fail to receive benefit from lumbar puncture because only dry lumbar taps have resulted. In other instances only a little blood, possibly from punctured vessels of the spinal plexus, has been obtained. This experience has been so

common that some clinicians² consider lumbar puncture to be of little value as a means of relief. It is not certain whether these dry taps are due simply to failure to enter the spinal subarachnoid space of the newborn infant or to clotting of the escaped blood in the canal. Undoubtedly the element of personal skill enters into the matter somewhat, but clotting also must be a factor in late cases of intracranial bleeding of severe degree.

It is a common observation that during an attempt to obtain spinal fluid, even in normal babies, the needle often injures the vascular spinal plexus with a resultant drainage of blood. From this fact confusion arises frequently in the diagnosis of cases of suspected birth injury in which blood is found in the lumbar fluid as to whether or not this blood really comes from the cranial cavity.

CISTERN PUNCTURE

In instances of suspected birth injury with dry lumbar taps or blood of uncertain origin in the spinal fluid, it has been my practice during the last two years to puncture the cisterna magna. At this latter site the fluid is practically free from contamination of blood from the operation itself, because the blood vessels are principally extradural at this location. The desired amount of fluid is always easily obtained, more direct access to the site of the trouble is gained, and all danger from hernia of the brain is obviated. The technic is safe in trained hands and is also easily acquired. About the same time that my earliest cases were undergoing treatment by cistern puncture, Brady³ employed, independently, the same method in two cases.

The technic of cistern puncture has been described by Wegeforth, Ayer and Essick⁴ in their original contribution. The application to infants has been set forth clearly by Porter and Carter.⁵ In newborn infants the usual landmarks are often ill-defined because of changes in the shape of the head and neck from molding, edema or other trauma. My preference in the infant, therefore, is to modify somewhat the foregoing technic. After the usual surgical preparation and anterior flexion of the head in the midline, the approximate position of the posterior rim of the foramen magnum is located by deep palpation. The ordinary lumbar puncture needle is then inserted a few millimeters above this point in the midline and in line with the glabella until the occipital bone is touched. The needle is then displaced downward, carrying the soft tissues with it, until the point of the needle slips under the posterior rim of the occipital bone. The needle is then cautiously pushed forward and upward, in line with the midpoint between the glabella and the anterior fontanelle, until the sudden "give" of the needle indicates the piercing of the occipito atlantal ligament, and withdrawal of the obturator should be followed by drainage of fluid from the cistern.

After a preliminary practice on the recent cadaver, no extraordinary difficulty should be experienced in the operation. Although the potential danger of injury to the medulla is seemingly great, the practical risk seems to be very slight. In 1985 cistern punctures on 450 collected cases by some fifty physicians, Ayer⁶ was unable to trace any vital injury to the puncture itself. In my series of 78 cistern punctures on 25 infants and children for various therapeutic and diagnostic purposes during the last four years, no harm has ever been observed. One of these infants sustained 26 cistern punctures without apparent harm, while under treatment for cerebrospinal fever with

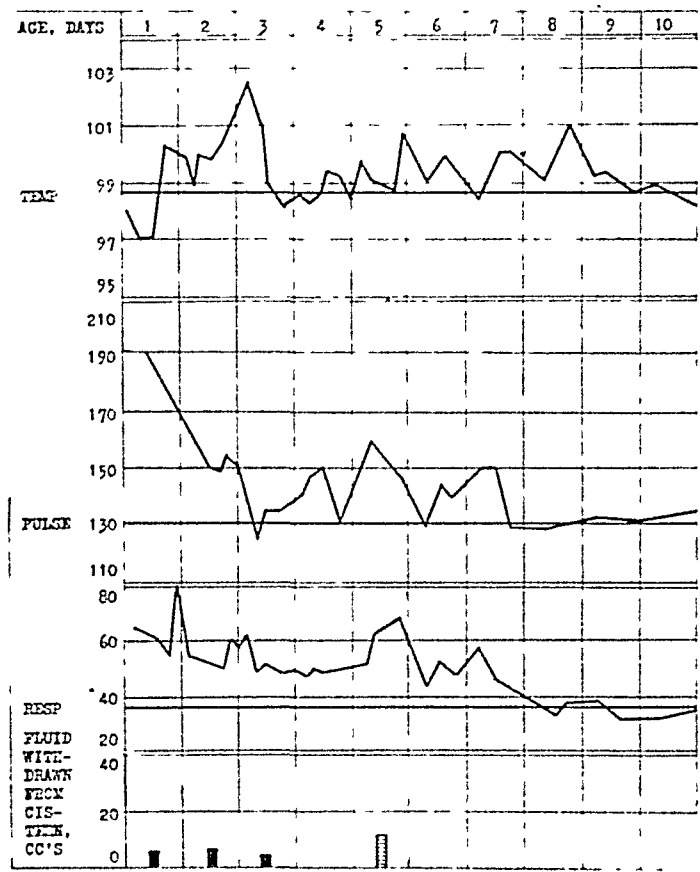


Chart I.—Case 1. Clinical course of basal intracranial hemorrhage with spinal block, treated by cistern puncture. Recovery. Solid blocks, whole blood; shaded block, part blood.

spinal block. When the vital significance of birth injury to the immediate welfare of the patient as well as to later cerebral defects is considered, one may justifiably assume a risk that promises further possibilities for relief and cure.

RESULTS FROM CISTERN PUNCTURE

Ten newborn infants with birth injury have received a total of 27 cistern punctures, ranging from one to eight each, as shown in Table I. Nine of these cases had an intracranial hemorrhage, of which one had a complicating edema of the brain as shown by necropsy. An-

TABLE I
CASES OF INTRACRANIAL BIRTH INJURY TREATED BY CISTERN PUNCTURE

CASE	DEVELOP- MENT* OR WEIGHT AT BIRTH	TYPE OF LESION	TIME SYMPTOMS FIRST NOTED	GENERAL CONDITION BEFORE TREATMENT	TREAT- MENT BEGUN	COAGU- LATION TIME†	SATISFACTORY PUNCTURES		PRESENT AGE MONTHS	RESULT
							LUMBAR	CISTERN		
1	Normal	Basal hemorrhage	Birth	Critical	Early	Normal	0	5	24	Cured
2	10 pounds	Basal and cerebral hemorrhage	Birth	Critical	Late	Normal	1	8	20	Recovery, defects Cured
3	Normal	Edema of brain	5 days	Critical	Late	Normal	0	1	16	Cured
4	Premature, 4½ pounds	Basal and cerebral hemorrhage and edema	Birth	Critical	Late	Normal	0	2		Died
5	Normal	Basal hemorrhage	3 days	Critical	Early	Normal	0	3	12	Cured
6	Premature, 4 pounds	Basal hemorrhage	Birth	Critical	Late	Normal		1		Died
7	Normal	Basal hemorrhage	Birth	Moribund	Late	25 minutes		2		Died
8	Normal	Basal hemorrhage	3 days	Poor	Early	19 minutes		1	10	Cured
9	9 pounds	Basal hemorrhage	1½ days	Critical	Late	Normal		3	9	Cured
10	Normal	Basal and cerebral hemorrhage	1 day	Moribund	Late			1		Died

*Normal development, 6 to 8 pounds. †Normal coagulation time, 4 to 8 minutes.

other baby had only edema. All patients presented manifest symptoms of injury; such as ocular disturbances in all, cyanosis and local twitchings or generalized convulsions in nine, and respiratory, cardiac, or temperature disturbances in eight. The general condition, when the babies were first seen, was classified in one case as poor, in seven cases as critical, and in two cases as moribund.

Preliminary lumbar puncture was done in five cases. Three of these had dry lumbar taps. In Case 2 (Chart II) there was drainage of blood on initial lumbar puncture and a manifest reduction of pressure at the fontanelle. Only dry lumbar taps were obtained afterward, how-

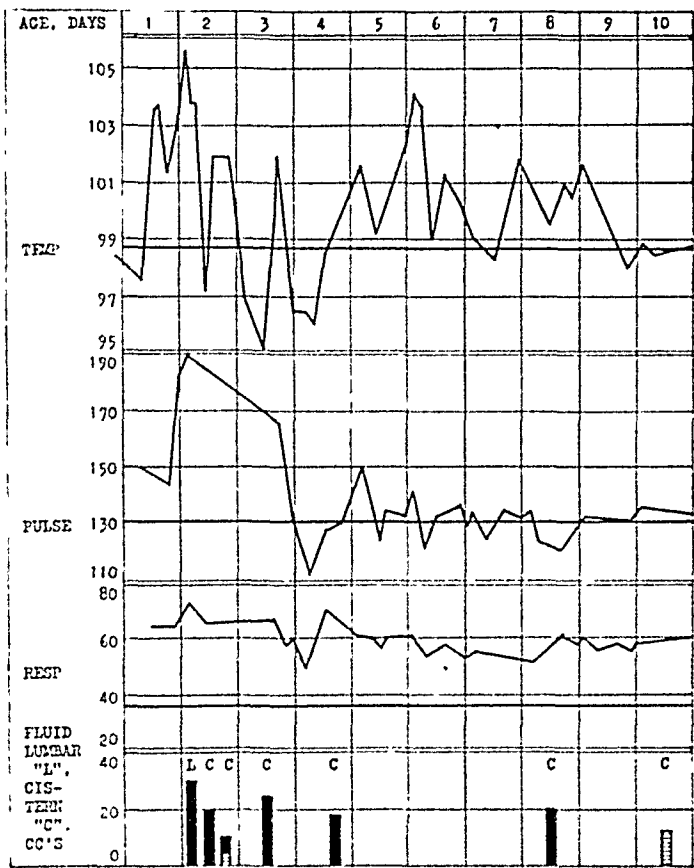


Chart II.—Case 2. Clinical course of severe basal hemorrhage and cerebral injury with spinal block and after one lumbar puncture, treated afterwards by cistern puncture. Recovery with moderate defects. Solid blocks, whole blood; shaded blocks, part blood.

ever, necessitating eight cistern punctures for continued relief from the symptoms of pressure and for eventual recovery. In Case 3 there was blood of questionable origin in the spinal fluid. A clear cistern fluid under increased pressure, obtained immediately afterward, together with prompt and permanent symptomatic relief, established the morbid condition in this case to be one of edema, rather than hemorrhage.

Six patients recovered. Their present ages range from nine to twenty-four months. The mental and physical condition is normal in

all, apparently, except in Case 2 in which there was manifest cerebral injury of moderate degree from the very beginning.

Of the four deaths, two were complicated by prematurity, another by delayed coagulation and moribund condition; the final case was also moribund when first seen.

The beneficial effect of cistern puncture on the color, sensorium and general condition was often prompt and marked. Improvement, if any, was usually evident within an hour and often while the needle was still in the cistern. A temporary increase of the pulse rate was often noted during the first few hours after the puncture; but the characteristic trend of the pulse, temperature and respiration curves was downward, as shown in the charts. Rest, quiet, supportive measures and, when indicated, the treatment of coincident circulatory depletion and shock were essential for recovery.

COMMENT

It is believed that the results from cistern puncture differ in no essential respect from those of adequate cerebrospinal drainage by lumbar puncture. In all instances of failure of drainage by the latter method, from spinal subarachnoid block or missed puncture, however, sufficient drainage may easily be accomplished by cistern puncture.

The diagnosis of basal hemorrhage or edema of the brain may be readily established or disproved by means of cistern puncture in all instances of uncertainty after lumbar puncture with questionable contamination of blood or with dry taps.

By those not well experienced in the technic of cistern puncture, this procedure should be reserved as a method of last resort after lumbar puncture has failed.

In the hands of the pediatricist, preferably, or others well trained in cistern puncture, it may be employed advantageously from the very beginning.

REFERENCES

- ¹Ehrenfest, H.: Causation of Intracranial Hemorrhages in the New-Born, *Am. Jour. Dis. Child.*, December, 1923, xxvi, 503.
- ²Holt, L. E.: *Diseases of Infancy and Childhood*, Ed. 6, revised, New York, 1913, D. Appleton & Company, p. 106.
- ³Brady, J. M.: Intracranial Hemorrhage in the New-Born, *Med. Clin. North America*, March, 1924, vii, 1453.
- ⁴Wegeforth, P., Ayer, J. B., and Essick, C. R.: Method of Obtaining Cerebrospinal Fluid by Puncture of the Cisterna Magna, *Am. Jour. Med. Sci.*, June, 1919, clvii, 789.
- ⁵Porter, L., and Carter, W. E.: *Management of the Sick Infant*, Ed. 2., revised, St. Louis, 1924, C. V. Mosby Company, p. 515.
- ⁶Ayer, J. B.: Puncture of the Cisterna Magna, *Jour. Am. Med. Assn.*, August, 1923, lxxxi, 358.

A CASE OF FETAL DYSTOCIA*

BY HERBERT THOMS, M.D., F.A.C.S., NEW HAVEN, CONN.

(From the Woman's Clinic, Yale School of Medicine)

THE following case is reported because of the unusual fetal monstrosity and, more particularly, because of the marked dystocia to which it gave rise at the time of labor.

The patient, an American primipara, aged twenty-one, had been married three years. Menstruation normal; the last period beginning October 4, 1924. Fetal movements were felt on February 26, 1925, and the date of estimated confinement was July 11, 1925. Except for nausea and vomiting, which were present in slight degree during the first three months, the pregnancy was uneventful.

A preliminary examination showed the external pelvic measurements as follows: spines, 25; crests, 29; trochanters, 35; external conjugate, 20; transverse outlet, 9. Because of the rigidity of the perineum, the diagonal conjugate could not be satisfactorily measured. Palpation of the fetal parts was difficult throughout pregnancy, because of the thick abdominal wall, but fetal maldevelopment was unsuspected at any time. The fetal heart, normal in rate and rhythm, was heard without difficulty.

The final prenatal examination on July 17, 1925, showed the patient to be apparently at term. The abdomen was symmetrically enlarged, and while the fetal small parts were not easily palpable, there was no evidence of disproportion. The fetal heart was heard in the left lower quadrant. Upon vaginal examination, the cervix was found two cm. dilated, and the vertex presenting but lightly engaged. A diagnosis of a left occipito-anterior presentation was made. The blood pressure was 130/70; the urine was negative.

The patient entered the Hospital July 24, having contractions which recurred at 2 to 3 minute intervals. She stated that the membranes had ruptured spontaneously two days previously, following which, labor pains began and continued with increasing severity. Because of the rigidity of the contracting uterus, the position of the fetus could not be made out, nor could the fetal heart be heard. Rectal examination at this time showed the cervix fully dilated and the vertex presenting just above the spines. No disproportion could be demonstrated. There was no advance of the presenting part, however, after an hour of severe second-stage pains. Vaginal examination then showed the cervix to be fully dilated, and the membranes ruptured. A small fetal head presented at the spines. Since there was a clear indication for the termination of labor, the patient was anesthetized, placed in the lithotomy position, and forceps applied for an L. O. A. It was immediately apparent, upon locking the forceps, that the fetal head was unusually small for a full-term fetus. Moderate traction failed to advance the head, and it was then evident that some obstruction was present higher up in the birth canal. Accordingly, the forceps were removed. The hand, because of the smallness of the fetal head and the normal size of the pelvis, was then passed without difficulty into the cavity of the uterus. As the examining fingers swept around the child's neck, the pedicle of a large cystic mass was felt in the occipital region. Further examination demonstrated that the cyst, which was the size of a large grapefruit, lay against the child's back and was firmly attached by a thick stalk to the occipital region. Because of its high situation, attempts to puncture the cyst with scissors failed. Accordingly, in the hope that the cystic mass would follow the fetal head, version and extraction was elected as a means of delivery. The procedure was accomplished without difficulty. The patient

*Presented at a meeting of the New York Obstetrical Society, January 12, 1926.

was somewhat shocked by the delivery and by the exhaustion of the long labor, but her symptoms were of short duration. The placenta came away without difficulty, and there was only moderate bleeding during the third stage.

The patient left the hospital in two weeks, after an uneventful convalescence.

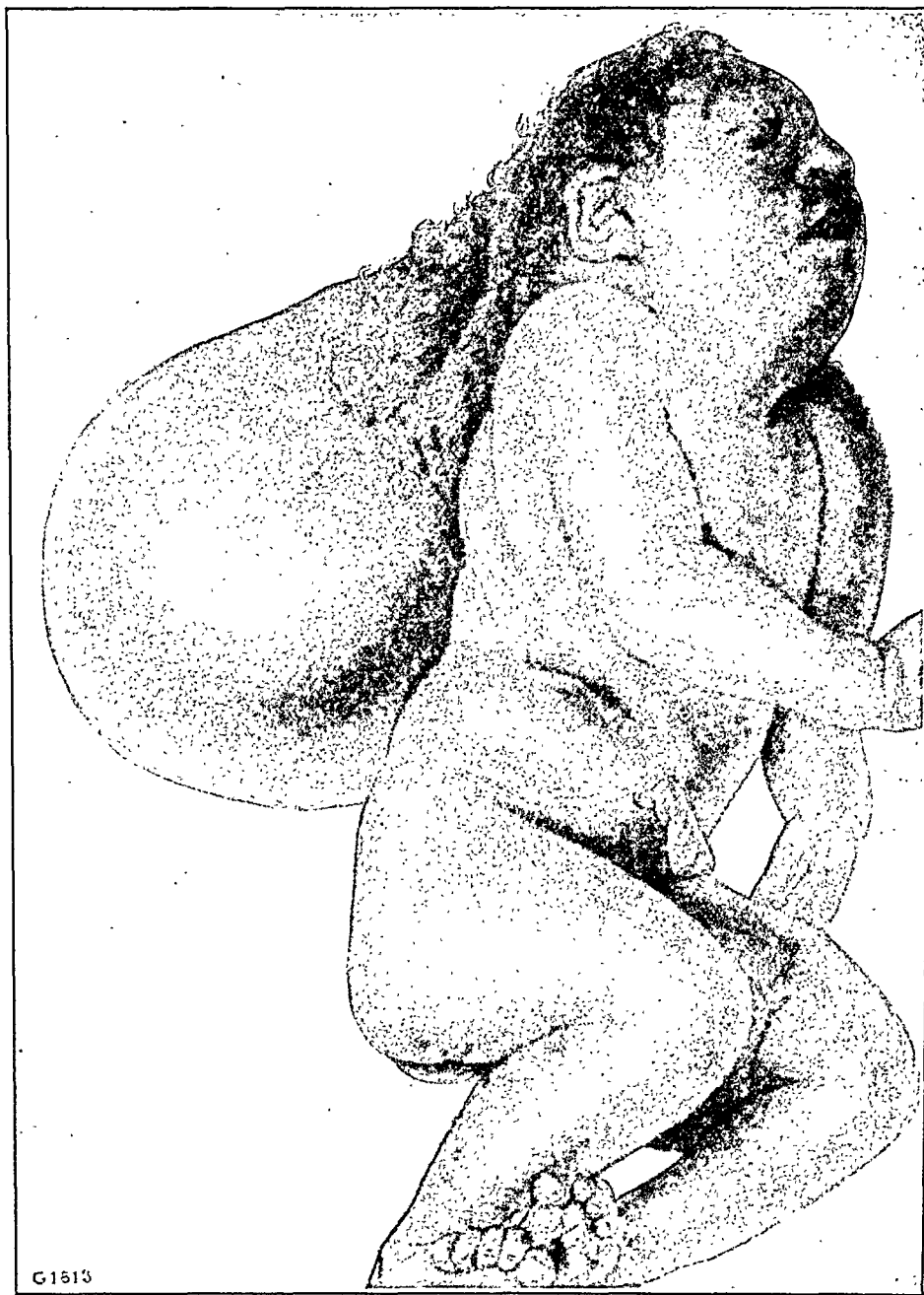


Fig. 1.

The macroscopic appearance of the specimen is shown in the accompanying drawings. It was of the female sex, measured 48 cm. in length and, with the tumor, weighed 4,000 grams. The biparietal diameter was 9 cm., the occipitofrontal 10 cm., the suboccipitobregmatic 8.5 cm., and the occipitomenal 10 cm. The viscera of the chest and abdominal cavities were normal in appearance and situation.

The cystic mass was covered by skin, which was continuous with that of the fetus, and the upper third merged with the scalp, as shown in the illustration. The lower

half of the cyst was filled with thin, blood-tinged fluid. The upper half was made up of two lobes of brain tissue, covered with dura. The cavity of the cyst communicated freely with the cranial cavity.

The failure to recognize this abnormality during the latter months of pregnancy is explained by the difficulty of palpation in the presence of a thick abdominal wall, together with the facts that the cranial bones of the fetus were well formed and that the tumor mass was soft and fluc-

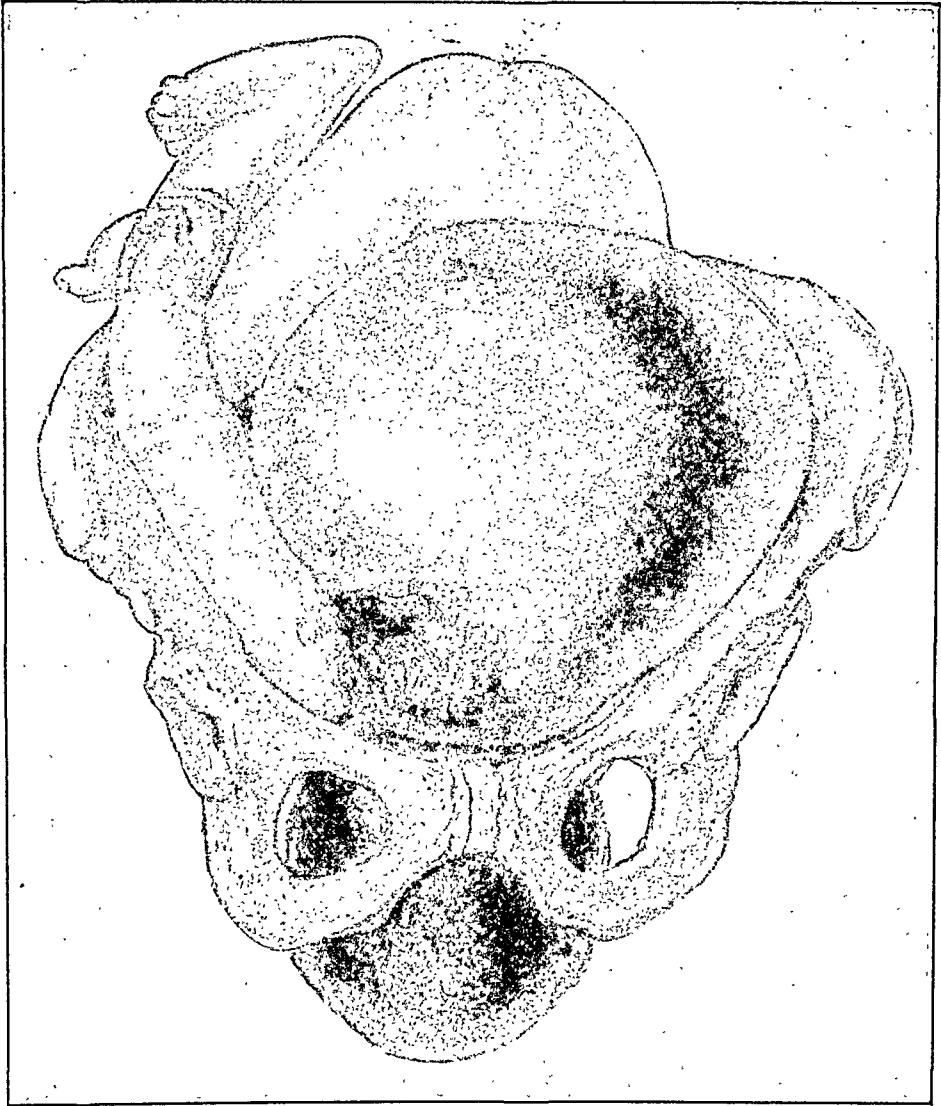


Fig. 2.

uant. The case is of interest, also, because the degree of dystocia was not appreciated until traction was applied to the head. It emphasizes particularly the dictum "Not Force but Art," as applicable in instrumental delivery where bony disproportion is known to be absent. Finally, it teaches again the lesson that in all cases of dystocia, thorough investigation of the birth canal is indicated before resorting to forcible attempts at delivery.

ABLATIO PLACENTAE*

BY WALTER E. WELZ, M.D., DETROIT, MICH.

THIS condition, otherwise known as abruptio placentae, utero-placental apoplexy, and premature detachment of a normally situated placenta, is more common than was formerly believed. As the toxemies of late pregnancy appear to be increasing in frequency, and as these are the main causative factors of this condition, it behooves us to study the causes, clinical aspects, and care of this condition in order to properly meet the dangers arising in the separation of placenta at or near term.

Harrar reported 254 cases in 100,000 labors in the New York Lying-In Hospital, a frequency of 1 in 395. Cragin, at Sloane Maternity Hospital had 212 cases in 20,000 labors, an incidence of 1 in 94. Holmes reports the clinical frequency as 1 in 500 and the pathologic as 1 in 200. In the past it has been mistaken for placenta previa, the result being that many statistics on this subject are misleading. Also, the partial detachment of a low placed placenta is not easy to distinguish.

In the past five years I have seen nine cases of the severely toxic type. The fetal mortality has been 100 per cent. The maternal mortality has been six (66 per cent). Of these, six were delivered from below and the usual means of combating hemorrhage were followed, i.e., packing, ergot, pituitrin, suturing the cervix. Five of these died, a mortality rate for this method of care for this type of 83 per cent. Two women of the three who had Porro sections performed made uneventful recoveries, though recuperation was slow due to exsanguination and toxemia; one died from exsanguination.

Of the less severe toxic type I have seen seven cases in the same period. The fetal mortality was 100 per cent and no maternal mortality.

I desire to report eight cases which illustrate the various types of ablatio placentae:

CASE 1.—Herman Kiefer Hospital. Mrs. E. T., age twenty-nine years, para iii. She was brought to the hospital in deep alcoholic intoxication. She had given birth to two full-term babies normally. No history of previous illness was obtainable. She was sent in by the City Physician because of vaginal hemorrhage.

Her measurements were normal. No edema was present. Blood pressure 120/85; pulse 110; temperature 98° F. (axilla). Catheterized specimen showed albumin and granular casts. The abdomen showed a rather tense uterus, the size of thirty-six weeks' pregnancy. Fetal heart and movements were absent, and fetal parts were not palpable because of the tenseness of the uterus.

*Read before the Detroit Obstetrical Society, Feb. 2, 1926.

The cervix was effaced, the os externum was about 4 cm. dilated and very dilatable, and the membranes were intact. A very dark red watery discharge trickled from between the uterus and the membranes. No placental tissue was palpable.

Diagnosis of ablatio placentae was made and delivery finished at once by easy manual dilatation, rupture of membranes, podalic version and extraction. The fetus, a female, 45 cm. long, weighing 4 pounds, 12 ounces, was stillborn. With the birth of the fetus came the placenta and 900 c.c. of clotted blood.

As the woman was deeply intoxicated, only a few whiffs of ether were given to keep her quiet during delivery. It required only ten minutes for delivery which was well endured by the patient, both pulse and blood pressure being the same after as before delivery.

After delivery a constant oozing of dark red watery blood continued. A catgut suture was placed in a very slight cervical laceration. There was no perineal laceration. The uterus was packed; 1000 c.c. saline solution was given by hypodermoclysis; 10 c.c. hemostatic serum was given intramuscularly, as well as stimulants. Hemorrhage continued through the packing and patient expired three and one-half hours after delivery.

Postmortem examination not permitted.

CASE 2.—Mrs. P. Z., Evangelical Deaconess Hospital, brought in by ambulance June 16, 1925. Patient twenty-two years old, well nourished, had had one normal childbirth in 1923. Her last period was October 19, 1924, and she expected confinement July 26, 1925. She had seen her physician only once during pregnancy. He reported that she had albuminuria and moderately high blood pressure.

At 11 A.M., June 16, the patient took to bed because of severe pain in the epigastrium. She commenced to discharge dark red watery blood from the vagina at 7 P.M. Her physician sent her to the hospital where I saw her at 9 P.M. I found a very pale patient writhing in constant pain which was general over a uterus the size of thirty-eight to forty weeks' pregnancy, but the pain was most accentuated in the epigastrium. The legs were edematous to the hips. Pulse 145; temperature 100° F.; respiration 24; blood pressure 140/115. While being examined the patient vomited considerable blood-tinged vomitus. As she was writhing in pain morphine gr. $\frac{1}{4}$ was given by hypodermic. No fetal heart or movements observed, and the uterus was so tense that parts could not be palpated. Vagina large, cervix one centimeter long. Os externum admitted two fingers. Membranes intact, cephalic presentation, head floating. There was a continuous flow of very dark red blood from the vagina. No placental tissue could be felt. Diagnosis of ablatio placentae was made and immediate laparotomy performed using ether anesthesia. Incision vertical from 2 cm. above to 12 cm. below the navel. Uterus was very dark in color with ecchymotic spots and marked edema of both broad ligaments. Vertical incision in uterus. In the fundus was found about 1.5 liters of clotted blood in which lay a free placenta. Stillborn male 45 in. long weighing 5 pounds was removed and the uterus emptied of contents. Supracervical hysterectomy was performed, with removal of tubes and ovaries. The patient was in fair condition at the end of operation which took fifty minutes. Blood pressure 85/120; pulse 144; temperature 101. Shock occurred shortly after operation. Patient given 1 liter saline solution by hypodermoclysis, also stimulants.

Patient had a slow recovery with slight septic temperature and was discharged July 6, 1925, twenty days after delivery. She then had blood pressure of 150/105, and the usual urinary findings of chronic nephrosis.

Pathologic report by Dr. Plinn Morse. No evidence of inflammation but numerous small intrauterine hemorrhages.

CASE 3.—Mrs. J. H., age twenty-five, para iv, Providence Hospital. I was called by Dr. R. Schaefer to see the patient at her home on the morning of July 10, 1925. She had her first child in 1920, a stillbirth after forceps delivery following forty-eight hours labor. Her second child, in 1922, was a normal delivery after forty-eight hours labor. The child had a small dorsal spina bifida from which it died in seven months. The third child, in 1923, was born normally after forty-eight hours labor. The patient had seen no physician during pregnancy. Her last period was in December, 1924, and she expected confinement September, 1925. During the night of July 9-10 she had severe pain mostly under left shoulder. A considerable amount of blood came away from the vagina, but she had no labor pains. She felt faint and was unable to get up, so a physician was called in the morning. She had vomited during the night.

The patient was a very large woman with a pasty complexion, and marked anemia. The legs had marked edema. The uterus was the size of thirty-eight to forty weeks' pregnancy; it was very tense and tender. No fetal parts were palpable; no fetal heart or movement audible. Temperature 99° F.; pulse 120; respiration 22; blood pressure 145/115. She was sent to Providence Hospital by ambulance. Eight hundred c.c. of saline solution were given by hypodermoclysis. Vaginal examination revealed a large vagina, retained cervix, canal open 1.5 cm., membranes intact, cephalic presentation, head floating. No placenta could be felt. A large amount of very dark fluid blood came from uterus on examination. Blood pressure 135/120. Urine showed heavy deposit of albumin, a trace of sugar, few granular casts. Hemoglobin was 40 Darc. RBC 2,700,000; WBC 15,000; nuclears 72, small mononuclears 26; large mononuclears 2.

Diagnosis of ablatio placentae, and preparation for laparotomy was made.

An incision 13 cm. long was made below the navel. Uterus appeared dark violet with edema of all tissues, especially both broad ligaments which were markedly edematous; dark blue ecchymotic spots over entire uterus. Placenta was found free in the fundus lying in about 1.5 liters of clotted blood. The fetus, a female, 45 cm. long, weighing 3 pounds, 7 ounces, was removed with the placenta and the clotted blood. Supracervical hysterectomy was done.

The patient had an uneventful recovery, except for slight sepsis. She was discharged Aug. 1, 1925, twenty days after delivery. Her pulse was rapid throughout, and was 100 on discharge. Blood pressure 150/110.

Pathologic report from Dr. J. E. Davis showed edema and chronic myometritis with small myometrial hemorrhages. No evidence of acute inflammation.

CASE 4.—October 9, 1920. Providence Hospital. Patient had typical rachitic pelvis. She had had a stillbirth in 1915 after forceps delivery following forty-eight hours' labor. In 1918, after induced labor, a living child, 45 cm. long, weighing 5 pounds, 6 ounces, was born. In 1920 labor was induced at thirty-six weeks by means of a Barnes' bag. In preparation a vaginal douche of 1 per cent lysol was used through an intrauterine douche nozzle. A rather severe hemorrhage followed as the stream was directed to one side. The bag was placed immediately and external hemorrhage stopped. Fetal heart sounds became weak in two hours and disappeared in three and a half hours after placing the bag. No violent movements of the fetus were noted. On expulsion of bag after eight hours, 500 c.c. of clotted blood were expelled. Easy breech extraction of stillbirth male 43 cm. long, weighing four and a half pounds. The fetus was pale, evidencing chorionic hemorrhage. The placenta was evidently attached low on body of uterus and showed signs of being detached on its lower third as evidenced by this part being hardened and covered by very adherent coating of firm fibrinous clot. The low attachment of the placenta allowed

the stream of lysol to separate it from the uterus because of a gaping lacerated cervix.

This is a typical case of the traumatic type of ablatio placentae, which is rather uncommon.

CASE 5.—Mrs. R. A., para ii, forty-one years of age. Providence Hospital, July 23, 1920. This patient had shown signs of nephrosis during pregnancy with slightly elevated blood pressure and characteristic urinary findings. She had edema of lower legs. Uterus was lax, thirty weeks' pregnancy. No fetal heart or movement observed. Constant trickling of dark fluid blood. Uterus was lax, not tender. After five hours labor there was a normal delivery of a female stillbirth, 38 cm. long, weighing 3 pounds. Immediately followed by the placenta with 800 c.c. of clotted blood. Tendency to hemorrhage controlled by uterine massage, 1 c.c. of pituitrin, and 4 c.c. of ergot.

At discharge urine showed albumin and casts. Blood pressure 160/110.

CASE 6.—Mrs. L. S., thirty-two years of age, para i. She was sent to St. Mary's Hospital December 19, 1920 after a profuse hemorrhage at home. Patient was very pale, and almost pulseless. Blood pressure 140/110. Uterus very tense and tender. No fetal parts palpable. There was no fetal heart sound or movement. Cervix effaced. The os externum was 2.5 cm. dilated. Dark red fluid blood constantly trickled from cervix. Edema of lower extremities and albuminuria. Five hundred c.c. of saline solution were given intravenously.

Manual dilatation of cervix which was soft and dilatable. Version and easy extraction. Stillbirth of a thirty weeks' female fetus, immediately followed by placenta and about 1 liter of clotted blood. Hemorrhage continued. Packing, saline by hypodermoclysis and stimulants were given. Death followed two hours after delivery.

CASE 7.—Mrs. J. S., Providence Hospital, Oct. 1, 1924, para ii, age twenty-seven years. In 1923 she had placenta previa at term, a stillbirth following bagging and version. At thirty-six weeks, Sept. 30, 1924, at 11 P.M., very sharp pains started in RLQ, but there was no contraction. These continued constantly through the night. Movements were felt through the night but disappeared early in the morning. In the morning labor had commenced but there was a continuous discharge of dark fluid blood from cervix. Uterus was very rigid, impossible to palpate fetal parts or get fetal heart sounds or movements. Continuous extreme pain and tenderness in RLQ.

Labor pains started 1 P.M., October 1. Complete dilatation at 3:30 P.M., at which time membranes ruptured. Breech extraction of stillborn male weighing 4 pounds, 8 ounces, at 3:40 P.M. At the delivery 600 c.c. of clotted blood came away. The placenta was expressed ten minutes later. A hematoma the size of a pigeon's egg was on the maternal surface, and six smaller hematomas were seen throughout the placenta. One-half of the placenta was covered with a firmly attached clot. The patient had been toxic for two months with albumin in urine and a blood pressure as high as 160/110.

After delivery there was no hemorrhage and recovery was uneventful.

CASE 8.—Mrs. M. A., a primipara, twenty-three years of age, came to Providence Hospital by ambulance January 24, 1926. Sent in as a case of placenta previa because of profuse hemorrhage at home just before midnight. Patient had vomited considerably at home.

The patient was extremely pale, had edema of lower legs, pulse 130, temperature 96.2° F., blood pressure 110 systolic and no diastolic. Uterus distended to xiphoid

though only thirty-two weeks' pregnant. No fetal parts could be felt. No fetal heart sounds or movements were obtained. Exquisite pain and tenderness over entire uterus.

Vaginal examination revealed primiparous birth tract. Cervix effaced with os of 1 cm. dilatation. No placental tissue palpable, cephalic presentation, head floating. From the cervix was a continuous flow of bright red blood.

Porro section was done at 2:40 A.M. under nitrous oxide-oxygen anesthesia. Incision was below the navel. Uterus found spotted with ecchymotic areas, slight edema of broad ligament. A male fetus, 44 cm. long, weighing 5 pounds, 11 ounces, was found floating in about a liter of fluid and clotted blood. Seven hundred c.c. of saline were given intravenously as well as pituitrin and ergot intramuscularly. At 3:20 A.M. the patient was removed to bed in fair condition. Sudden collapse and death at 4:40 A.M.

Examination of uterus showed numerous small hemorrhages throughout the musculature.

COMMENT

Very few cases of *ablatio placenta* are of the traumatic type. These are not so dangerous as the toxic type and can be delivered by the natural birth route. The toxic type is more frequent and more dangerous.

The most dangerous of the toxic type are those in which intramuscular hemorrhages occur. These are diagnosed by the tenseness and tenderness of the uterus, together with uncontrollable hemorrhages and shock. Porro section appears to be the only successful method of disposing of this type.

The less dangerous toxic type is the one in which there are placental hemorrhages with hematoma formation. As the uterine musculature is not involved in hemorrhage, it is capable of contracting after being emptied. This type may be delivered through the birth canal. Following delivery uterine stimulants and packing will control hemorrhage. In this type the uterus is not tense or tender but lax before delivery.

497 EAST GRAND BOULEVARD.

PURPURA HEMORRHAGICA COMPLICATING PREGNANCY

REPORT OF A CASE IN WHICH BOTH MOTHER AND CHILD WERE
AFFECTED AND RECOVERED

By PHILIP LIEBLING, M.D., NEW YORK

PURPURA hemorrhagica complicating pregnancy is a rare condition. According to Hirst,¹ the disease is generally fatal and always interrupts pregnancy, the fetus dying *in utero*. Rushmore² in 1925 made a thorough review of the literature and was able to find only forty-seven reported cases of purpura complicating pregnancy, to which he added one of his own.

The first case was reported by Barnes³ in 1867. This patient appeared to have rheumatic purpura, or Schönlein's disease. During the sixth month of her pregnancy, she suffered rheumatic pains in the joints, lumbago, vomiting, and fever. Labor followed, but the infant lived only three hours. On the day after delivery, the mother had an eruption of purpuric spots on the face, abdomen, and legs. The patient died on the following day.

Rushmore, in his review of the literature, noted the occurrence of purpura hemorrhagica in both the mother and the fetus only seven times. In Dohrn's⁴ case, many petechiae were observed during the period of pregnancy, but they disappeared at the time of delivery. The fetus, a female born in the ninth month, exhibited spots that were similar, as to number, size, and color, to those found on the mother.

Recurrence of purpura in a succeeding pregnancy was reported by Greenhill⁵ in 1923. His patient had purpura during her first and second pregnancies. In the case reported by Vignes and Stiassnie⁶ in 1921, the purpura recurred in three successive gestations during a period of ten years.

Of the forty-seven cases summarized by Rushmore, the final results were recorded in only forty-four. Twenty-six mothers died and eighteen recovered. Of the forty-two infants whose final outcome was reported, twenty-seven died and fifteen survived.

In the thirty-eight cases in which the age was recorded, it ranged from eighteen to forty-three years.

REPORT OF A CASE

A primipara, aged twenty-two, was first seen by me on July 17, 1925, during the seventh month of her pregnancy. The family history was negative for any hemorrhagic tendency. The last menstrual period took place on December 22, 1924.

Toward the end of the fifth month, the patient began to notice some small red

*Read before the Bronx Gynecological and Obstetrical Society, November 30, 1925.

spots on her body and limbs. They appeared in successive crops, the earlier ones fading after a few days. When she brushed her teeth or chewed solid food, her gums bled easily; she also had several mild attacks of epistaxis. The bleeding was easily controlled by local treatment.

On June 20, the patient was seen by a physician, at which time she was covered with petechiae. There were numerous purpuric spots on the extremities. She complained of frequent nosebleed, bleeding from the gums, slight swelling of the feet and general weakness. Her blood count revealed 2,400,000 red blood cells and 45 per cent of hemoglobin. The platelet count was 40,000, an extremely low figure that is characteristic of purpura.

When I first saw the patient, her skin and mucous membranes were pale. There were numerous petechiae scattered over the entire body. Some of the hemorrhagic spots were fading; others appeared to be of recent origin. There was a large ecchymosis on the palate and many small hemorrhagic spots on the gums and the inside of the cheeks. The spleen was not enlarged.

The patient was treated with calcium lactate and saccharated ferrous carbonate, 20 grains of each three times a day. She was also advised as to hygienic and dietary measures.

She returned on July 30, at which time the petechiae and hemorrhagic spots were found to be much fewer in number. Epistaxis was much less frequent than formerly. The red blood cell count was 3,500,000; hemoglobin, 70 per cent. The platelet count had risen to 300,000, a normal figure.

From this time on, the patient's condition improved rapidly. The petechiae became fewer in number and the purpuric spots disappeared, except for a slight ecchymosis on the upper part of the palate. There was a concomitant improvement in the platelet count, as shown in Table I. Epistaxis became infrequent, and the color of the skin and mucous membranes improved. The patient no longer suffered from weakness, and the swelling of the feet and ankles disappeared.

The patient went into labor late September 30, and delivered a girl, weighing eight pounds, eleven ounces, early on October 2. The baby had numerous petechiae over her face, trunk, and extremities. She was somewhat cyanosed but cried vigorously when handled. Nine hours after birth, and again several hours later, the child regurgitated some water mixed with blood. On the following day, she again brought up some blood-streaked liquid. On October 4, bloody urine was passed; on the following day, the stool was streaked with blood. The temperature was 101° F. The baby was then given 5 c.c. of thromboplastin, injected into the buttock.

The baby's blood count on October 5 was 6,000,000 red blood cells and 110 per cent hemoglobin. The platelet count was 40,000. The coagulation and the bleeding time, being short, were not estimated.

The petechiae present on the baby at birth gradually faded, and no new ones appeared. On October 7, there was a slight bloody discharge from the child's vulva.

The mother's blood on October 5 gave the extremely low platelet count of 20,000. The erythrocyte count was 3,400,000; the hemoglobin, 66 per cent. The coagulation time was five minutes. On many previous examinations, it had ranged from seven to eight and a half minutes. The bleeding time was four and a half minutes.

From this time on, there was progressive improvement in the condition of both mother and child. On October 14, when the patients were discharged, practically all of the hemorrhagic spots had disappeared.

On October 23, the mother had a few petechiae on her shoulders and on her left arm and leg. The baby looked healthy and there were no petechiae. On October 30, the mother showed some new petechiae on her shoulders, chest, and lower limbs, and there was an area of ecchymosis about the size of a quarter on the upper por-

tion of the palate. The baby appeared healthy and had gained weight, but there were some petechiae on the legs and ankles. The results of the baby's blood examination are shown in Table II.

On November 27, the mother still had a few petechiae on her extremities, but there were no other signs of bleeding. The baby was healthy, weighed nine pounds, 6 ounces, and showed no petechiae. When the patients were last seen on December 30, they were in perfect health and no petechiae could be found.

TABLE I
MOTHER'S BLOOD EXAMINATIONS

DATE	PLATELETS	R. B. C.	HGB. %
6-20-25	40,000	2,400,000	45
6-25-25	40,000	2,400,000	45
7- 7-25	116,000	2,900,000	59
7-13-25	58,000	2,500,000	66
8- 5-25	300,000	3,500,000	70
8-12-25	370,000	3,300,000	70
8-19-25	330,000	3,500,000	74
8-26-25	285,000	4,000,000	75
8-28-25	285,000	4,000,000	75
9- 9-25	—	2,500,000	75
9-16-25	322,000	3,500,000	74
9-23-25	300,000	3,200,000	71
10- 5-25	20,000	3,400,000	66
10- 8-25	160,000	3,420,000	70
10-31-25	200,000	3,200,000	77

TABLE II
CHILD'S BLOOD EXAMINATIONS

DATE	PLATELETS	R. B. C.	HGB. %
10- 5-25	40,000	6,000,000	110
10- 8-25	No estimation—coagulation and bleeding time short.		
10-31-25	240,000	4,800,000	99

SUMMARY

Purpura hemorrhagica complicating pregnancy is a rare condition, only forty-eight previous cases having been reported. The occurrence of this condition in both mother and child is still more uncommon; Rushmore's extensive review of the literature cites only seven such cases.

The blood platelet deficiency in purpura hemorrhagica complicating pregnancy probably arises from some toxemia of maternal, fetal, or placental origin. The source of the blood platelets is the bone marrow, where they are formed by budding off from the megacaryocytes. The toxic substance may destroy the platelets soon after their formation, or it may destroy the megacaryocytes themselves.

The presence of purpuric symptoms in the offspring is probably the result of the absorption of toxic substances from the maternal blood.

This case is reported as a symptomatic purpura in which a primip-

ara began to show petechiae during the fifth month of pregnancy. The hemorrhagic eruption reached its maximum during the sixth month; then it gradually lessened, but did not disappear until about two months after labor. There was also bleeding from the nose and gums. The child was covered with petechiae at birth and showed a tendency to bleed soon afterward. An extremely low platelet count was found in both mother and child. The mother showed considerable anemia, but the child's red blood cell count and hemoglobin were above normal. Both patients recovered.

REFERENCES

- ¹Hirst, B. C.: Textbook of Obstetrics, Philadelphia, W. B. Saunders Company.
- ²Rushmore, S.: AM. JOUR. OBST. AND GYNEC., October, 1925, x, No. 4, 553.
- ³Barnes: Brit. Med. Jour., 1867, ii, No. 375, 383.
- ⁴Dohrn: Arch. f. Gynäk., 1874, vi, 486.
- ⁵Greenhill: (In discussion of Mosher's case.) Surg., Gynec., and Obst., April, 1923, No. 4, p. 584.
- ⁶Vignes and Stiassnie: Bull. Soc. d'obst. et de gynec. de Par., 1921, xx, 8-11.

920 AVENUE ST. JOHN.

SYPHILIS OF THE PLACENTA IN THE NEGRO

A STUDY BASED ON 1000 CONSECUTIVE CASES

BY JAMES R. McCORD, M.D., ATLANTA, GA.

(From the Department of Obstetrics, Emory University School of Medicine)

WE OFFER the following work as a further contribution to the fascinating but little understood subject of syphilis in pregnancy. All of the slides were personally studied, at least two from each placenta. As a rule, one was made from the fetal surface of the placenta, the other from the maternal.

As a basis for a syphilitic placenta, we have accepted the changes recently described by Eardly Holland:

1. The villi are uniformly enlarged and closely packed.
2. A reduction of the intervillous spaces.
3. An increase in the density of the stroma and of the stroma cells.
4. Diminished vascularity of the villi.

When the above changes were only partial, we designated the condition as doubtful.

We agree with Holland's statement, that the vessels in a syphilitic placenta are not closed by an obliterating endarteritis, but rather that the villi have never been properly vascularized.

Of the 1000 placentas examined for syphilis, 119 were positive, 35 were doubtful, and 846 were negative.

There were 821 cases that went to full term, and 791 babies were born alive. Of these babies, the placenta was positive in 38 and doubtful in 13. Thirty babies were stillborn at full term; of these, the placenta was positive in 12, doubtful in 1 and negative in 17.

There were 84 babies premature, but born alive. The placenta was positive in 13 of these, doubtful in 8, and negative in 63.

There were 84 (the coincidence is noted) premature babies stillborn. In 50 of these the placenta was positive, doubtful in 7. In 27 cases the placenta was negative. In 8 premature stillbirths, both the cord and maternal Wassermann, as well as the placenta, were negative. There were 3 full-term stillbirths in which Wassermann reactions and placenta were negative.

Abortion occurred fifteen times. The placenta was positive in 5, doubtful in 1, and negative in 9.

A Wassermann test was done on 966 of the women. In 747 the reaction was negative, and in 219 (22.5 per cent) positive. In 119 cases in which the maternal Wassermann was positive, the placenta was negative. In 89 cases, both the maternal Wassermann and the placenta was positive. There were 11 cases with a positive maternal Wassermann in which the placenta was doubtful. The placenta was positive in 24 cases where the maternal Wassermann was negative, and doubtful in 13 cases with negative maternal Wassermann. The Wassermann taken in the prenatal clinic was repeated in the labor room on 396 women. The reaction agreed in 349 cases (88 per cent). In 311 cases both were negative, and in 38 cases both were positive. The clinic Wassermann was positive and the labor Wassermann was negative 26 times; the clinic Wassermann was negative and the labor Wassermann positive 21 times.

The cord Wassermann was done on 655 babies. Of these, 608 were negative and 47 (0.7 per cent) positive. In 35 cases in which the cord Wassermann was negative, the placenta was positive; and in 13 cases with the cord Wassermann negative, the placenta was doubtful. A positive cord Wassermann occurred 26 times with negative placenta. One cord Wassermann was positive in which the placenta was doubtful. In only 20 cases, was the cord Wassermann and the placenta both positive.

The maternal Wassermann was positive 66 times where the cord Wassermann and the placenta were negative.

In 19 babies born alive, the maternal and cord Wassermann were positive and the placenta was negative. In only 12 cases were they all positive. In 20 cases in which the cord Wassermann was negative, the maternal Wassermann and the placenta were positive. The maternal Wassermann and the placenta were positive 11 times where the cord Wassermann was negative. There were 2 stillborn babies where the cord and maternal Wassermann and placenta were all positive. In 6 cases the cord Wassermann was positive, and the maternal Wassermann and the placenta were negative. The cord and maternal Wassermann were negative 14 times where the placenta was doubtful.

We are unable to state whether prenatal antisyphilitic treatment

does or does not influence the histologic structure of the placenta. We were not able to demonstrate a gumma in any of the placentas.

TABLE I
HISTOLOGIC EXAMINATION OF 1,000 PLACENTAS

PLACENTAS	MATERNAL WASSERMANN		CORD WASSERMANN	
	Positive	Negative	Positive	Negative
119 Positive for syphilis	89	24	20	35
846 Negative for syphilis	119	710	26	560
35 Doubtful for syphilis	11	13	1	13

TABLE II
MATERNAL WASSERMANN

MATERNAL WASSERMANN	CORD WASSERMANN		PLACENTA		
	Positive	Negative	Positive	Negative	Doubtful
219 Positive	32	112	89	119	11
747 Negative	8	470	24	710	13

TABLE III
BIRTHS

BIRTHS	PLACENTA			CORD WASSERMANN		MATERNAL WASSERMANN	
	Positive	Negative	Doubtful	Positive	Negative	Positive	Negative
Full time living	38	740	13	27	528	142	617
Full time dead	12	17	1	5	10	9	17
Premature living	13	63	8	6	51	24	57
Premature dead	50	27	7	3	23	49	43

SUMMARY

Syphilis was demonstrated in 15.4 per cent of the 1000 placentas examined.

In 966 women, the Wassermann was positive in 22.5 per cent.

In 655 babies, the cord Wassermann was positive in 0.7 per cent.

The Wassermann reaction repeated on 396 women agreed in 88 per cent.

Syphilitic placentas were found in 40.6 per cent of the positive Wassermann cases, and in 0.3 per cent of the negative Wassermann cases.

In 84 premature babies born alive, the placentas were positive in 28.5 per cent.

In 84 premature babies born dead, the placentas were positive in 67.8 per cent.

Of 219 positive maternal Wassermans, the cord Wassermann was positive in 14.5 per cent of the cases.

Of 747 negative maternal Wassermans, the cord Wassermann was positive in 0.107 per cent.

Of the positive placentas, 75 per cent had positive maternal Wassermans.

PREGNANCY IN THE REMAINING HORN OF A UTERUS DIDELPHYS AFTER TORSION AND PARTIAL HYSTERECTOMY

By C. E. CASWELL, M.D., WICHITA, KANSAS

THE following case seemed unique enough to warrant a record in obstetric literature. On January 8, 1924, the patient referred to below was operated upon by Dr. Harry Horn, of this city, and the case described in *Archives of Surgery* of November, 1924. Torsion had developed in the gravid side of this double uterus at about the sixth month without demonstrable cause. A laparotomy was done, the twisted pregnant portion incised, the fetus and separated placenta delivered, and a supravaginal hysterectomy done on the gangrenous half of the uterus. The patient made an uneventful recovery and subsequently resumed her menstrual periods.

The patient, Mrs. S. J., came again for examination March 18, 1925, reporting that her menses had been normal until December 3, 1924, which was her last period, and that she thought she had already felt life. Her pregnancy proceeded normally, both cervixes enlarging and softening at about the same rate. On August 18, examination showed the breech in the pelvis. Attempts then and later to do an external version were unsuccessful. September 18, blood pressure being 150/90, and there being considerable edema, castor oil and quinine were administered. Pains began at 10 A.M., both feet presenting, and she was delivered of a six and a quarter pound boy at 7:25 P.M., episiotomy being done and forceps applied to the after-coming head. During the later part of her pregnancy and during labor the fundus was inclined toward the left side of the abdomen. The cervix dilated normally, but up to within a few minutes of the time the feet were delivered, the side where it joined the other cervix had not been drawn up out of reach. Involution was rather slow but she made a good recovery.

110 NORTHERN BUILDING.

Department of Maternal Welfare

CONDUCTED BY FRED L. ADAIR, M.D.

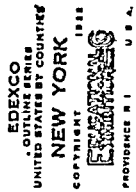
LECTURES IN OBSTETRICS TO COUNTY SOCIETIES IN NEW YORK STATE

AN IMPORTANT activity is being developed by the New York State Department of Health in cooperation with the Committee on Postgraduate Medical Instruction of the State Medical Society. A sentiment has grown among physicians that the steadily increasing group consciousness and the growing desire of organized medicine to assume leadership in the solution of the great problem of public health, fix a very definite responsibility upon the official medical bodies. This particular committee, in its last annual report of the House of Delegates, made in April, 1926, states that the continuous education of the practicing physician is the greatest single contribution that organized medicine can make.

The manner in which this scheme was developed is of interest. The committee as appointed represented all sections of the State and a survey was made based upon answers to a questionnaire sent to the County societies as the units of the organized profession. The officials of these societies were asked what plans they had made or would agree to make for postgraduate teaching and what facilities for the purpose were at hand. A central organization for the collection of this information was developed under the direct supervision of Drs. C. A. Gordon and A. N. Thompson, of the Kings County Medical Society, and an appropriation totaling \$5,000 was secured from the Council of the State society. The New York State Department of Health offered its full cooperation and placed the services of its regional consultants in obstetrics and pediatrics at the disposal of the Committee.

Of particular interest in connection with this important work are the courses of six lectures each in obstetrics and pediatrics which were offered to various County societies and which it is a pleasure to record have been well attended. The appended map is a graphic presentation of the work which has been done. The lectures on obstetrics have included prenatal care, management of normal labor, postpartum care, and the pathology of labor and pregnancy, and have been given by various members of the Regional Consultant staff of the State Department of Health, including, among others, Drs. John O. Polak, Frederick W. Rice, Ralph W. Lobenstine, Harold C. Bailey, George W. Kosmak, James K. Quigley, and Arthur C. Martin.

The activity described above is worthy of emulation by county organizations in other states. It presents the subject of better maternity care directly to the attention of the practicing physicians by a method that originates and is carried out within the ranks of the medical profession. It provides for cooperation with various lay agencies, but the essential aim of the movement is an effort to solve a medical problem under medical auspices.



Society Transactions

NEW YORK OBSTETRICAL SOCIETY

MEETING HELD DECEMBER 8, 1925

THE PRESIDENT, DR. O. PAUL HUMPHSTONE, IN THE CHAIR

DR. J. A. CORSCADEN read, by invitation, a paper on the **Significance and Management of the Artificial Menopause**. (For original article, see p. 803.)

DISCUSSION

DR. ROBERT T. FRANK.—I think that we should distinguish between the operative menopause and the induction of the menopause by means of radiotherapy in young women, because it is very difficult to find the right sterilizing dose, and a large number of young women who apparently have been sterilized, at some later date, sometimes in a year, sometimes in three years, resume their menstrual function, and thereby show that the sterilization was only temporary.

I would like to make clear just what the menopause is. It is due either to the complete withdrawal of the female sex hormone or to a subthreshold effect. The female sex hormone, being a chemical entity, has an active dose, a dose requisite to produce symptoms. A subthreshold amount may be present and may relieve some of the minor symptoms, which we ascribe to the menopause, and yet be insufficient to produce the cyclic evidence which manifests itself through the menstrual cycle, especially through menstruation itself.

I am very glad to hear Dr. Corscaden say that obesity does not develop, nor do marked changes in appearance, sex characteristics, or the libido occur. I can endorse all these findings. That at the age of twenty-five he would expect basic physical changes, is probably not what he meant to imply, except such physical changes as we actually find locally, meaning thereby atrophic processes which take place in the breast and in the pelvic genital tract.

My findings in regard to arthritis do not agree with his. I think that perhaps "arthritis" is a misnomer. I have not as yet been able to follow it up from the x-ray point of view to see whether or not actual joint changes occur, but the frequency of the new complaint of pain in the shoulder-, elbow- and knee-joints is striking. We are making it our business at present to follow this up more closely in order to see whether actual bone changes do take place.

That the basal metabolism shows no marked evidence of change by means of the clinical methods employed does not surprise me. I agree fully that the flashes are the most marked symptoms. Hypertension, I agree, should be ascribed as much to outside circumstances as to the age.

When we come to the nervous signs, as Dr. Corscaden mentioned, the seven bad cases might have been weeded out if more careful investigation of the patients had been feasible before operation. Very often, even with the presence of nervous symptoms, it may for physical reasons (fibroids or continuous functional hemorrhages) be advisable to produce the menopause.

I also agree with him that the x-ray, in preference to the operation should be used in these nervous types to minimize the shock.

That emotional instability was not at least made worse in but 27 per cent of the cases is most gratifying.

When Dr. Corscaden speaks of the endocrine and the psychiatric school in reference to this question I must differ with him. I am not a modern endocrinologist—I try to keep my feet on the ground—, but I think as far as any menopause effect is concerned it is purely and entirely endocrine. That the effects are no greater than Dr. Corscaden has shown them to be simply means that the endocrine effects are not tremendously marked in the adult.

When he comes to the treatment of neurosis, I think we might sum up by saying that a careful study of each patient in advance may put us in a fairly exact position to judge how such a patient will react to operation or to radiotherapy, the results of which very often bring about shock corresponding to that of an operative intervention. That we are not always in a position to take the time to enter into these questions beforehand is perhaps a reflection on us, but such is often the case.

Now, as to the "inferiority complex" of the female, I have not been convinced by Liebman and others. I have seen as severe cases of, we will say, absence of ovarian function in the most male type of woman as in the smallest, most shrinking mid-Victorian flower. The one thing that we cannot get away from is that in certain individuals—and I will accord that it is in individuals who show some neurotic tendencies, some inferiority of the nervous system, which may show itself on psychoanalysis—vasomotor and local changes take place, but I firmly predict that as soon as I am able to produce an active female sex hormone (which is not so unpleasant and does not produce such severe local reactions that I refuse to give it to the human being), all those symptoms of atrophy as well as the vasomotor symptoms can be relieved at once.

Furthermore, I want to emphasize the point that ovarian extracts cannot possibly do any harm by acting on the suggestibility of the patient. The only good I have ever seen the commercial extracts do was done by suggestion.

In other words, Dr. Corscaden has shown great acumen in weeding the unimportant from the important symptoms. He has shown how rarely important symptoms develop. He has tried to overcome the folklore fear which has existed among the females, by his psychic therapy.

I hope that within a reasonable period we will have an effective drug at our disposal which will to a great degree relieve the ovariophrenic symptoms and yet need not be given in such dosage that it will reproduce the very symptoms for which the patients were originally treated.

DR. HAROLD BAILEY.—This paper, it seems to me, again establishes the fact that the artificial menopause, or at least the one produced by irradiation, is no more severe than the actual one.

I should like very much to have some information concerning the effect of administering ovarian extract to women who, a year or two after sterilization, have marked flashes. Does the administration of this extract tend again to cause flowing?

Some years ago I stated that 1,500 millicurie hours from radium in platinum placed within the uterus was a sterilization dose but I have had to retreat from this position. It is difficult to establish the dose, and I think that in cases in which only a small dose is given, it is exceedingly dangerous to administer the extract, unless one wishes the bleeding to recur. In my cases I postpone the administration of the extract as long as possible, though in a considerable number of cases it is advisable to give it in order to relieve the menopause symptoms.

I disagree with Dr. Frank. I believe that the extract is tremendously effective

in reducing the flashes, so much so that in some cases they are practically absent, and, therefore, I think that it is influential in controlling the menopause symptoms.

I was interested to hear the author say that he had noticed a diminution in the size of the uterus and the cervix. I have not observed this, and I should feel that the dosage he ordinarily gives would not be likely to produce this decrease in size. I have felt that irradiation sterilization led to a milder menopause. I think that the parts of the ovary other than the follicular apparatus continue to work and therefore, from the standpoint of the menopause symptoms, this form of sterilization is preferable to the operative method.

DR. GEORGE G. WARD.—I wish to echo what Dr. Bailey has just said. I entirely agree with his statement and disagree with that of Dr. Frank in regard to the value of ovarian extract in the hot flashes. Dr. Frank, if I understood him correctly, has said that whatever good it did was accomplished entirely by suggestion. I am quite convinced that that is not so. I have several cases in mind where the women did not know what they were taking, and I am quite sure from rather a lengthy observation of this remedy that it has a distinct value in limiting the extent of the hot flashes.

DR. HIRAM VINEBERG.—It seems to me that in spite of all our investigations we are still very much in the dark as to the cause of the symptoms that follow removal of the ovaries and uterus. This was very well shown by a large collection of cases, followed up for some time by Mandel and Buerger, which showed that in a large percentage of cases the greatest severity of the menopausal symptoms was found in women over forty, about forty-five or forty-six. This percentage was so marked that they came to the conclusion that it was not always the removal of the glands that caused these disturbances but some disturbance of the nerves of the pelvis. Cases in which the tubes and ovaries had been removed demonstrated this. The patients had gone through the menopause cycle; three or four years had elapsed, and then the uterus had to be removed for some reason. Then there was a recurrence of the menopause syndrome, showing, evidently, that something other than this removal of the ovaries may cause these symptoms.

I am sorry that my experience puts me in a class with Dr. Corseaden, not because I do not use ovarian extract, but because I have had such poor results from its use. In elderly women, past forty, I have found that a combination of bromides and tincture of valerian gives better results than any of the ovarian extracts I have used.

DR. H. R. CHARLTON.—If the hot flash is the most troublesome symptom from which women suffer during the menopause and if ovarian preparations have not been effective in controlling it, there is a drug which does eliminate this discomfort, namely atropine.

In my experience the vasomotor instability, tremor, active sweating and nervous irritability following the surgical menopause have been almost uniformly controlled by this drug. During the last two years in the Out-patient Department of the Woman's Hospital I have utilized it with great satisfaction. From 1:1000 to 1:100 of a grain every four hours is prescribed, and I have yet to see a case which has not been helped; some have been completely relieved.

DR. S. H. GEIST.—Dr. Corseaden's paper interested me particularly because of recent studies that we have been conducting at Mt. Sinai on the effects following operative castration. We did not study the change in psychic attitude of the patient, but took up the question of basal metabolism, weight, blood chemistry and blood pressure. In none of these investigations were we able to determine

any definite or constant change that could be ascribed to the operative removal of the ovaries, except, possibly, the tendency to increase in weight. We found that the blood chemistry and the blood pressure remained within definite normal limits up to a period of three months postoperative.

As to the value of ovarian extracts in the control of the symptoms following castration, I might mention that two or three years ago, working with one of the men in our laboratory, we published a series of experiments dealing with the activity of the various commercial extracts. These extracts we obtained directly from the various manufacturers and were presumed by them to be active. We found that the introduction of these various preparations intravenously in doses even far in excess of those given to human beings, had no effect in preventing the atrophy of the genital organs or breasts. Of course, as we were using rabbits for our experimental purposes, we were not able to determine what the effect of the administration of these drugs would be on the "hot flashes."

The cervix did not atrophy, though I do not believe this was the result of the administration of the various preparations.

DR. J. A. CORSCADEN.—In regard to the question of the age at which we should expect genital changes, I agree thoroughly with Dr. Frank. We have only 12 cases altogether. They run, however, from the age of fifteen up, so that in the younger group we might expect some change in the body characteristics. I suppose that the proper way to investigate this point would be to radiate the ovaries of a 6- or 7- or 8-year-old child, and then watch the development as we do in the regular menstruation experiments.

The question of arthritis, is still to be answered. Cecil's article on the normal menopause looked to me like a discussion of arthritis in elderly ladies, as are Hopkins' articles on hypertension of the menopause. The cases of arthritis occurred in women several years before, several years after, or coincident with the cessation of menstruation.

Whether Dr. Frank—and I am sure he will, from the rapid strides which have been made—gets a substance which can be used as a specific is not as important to me now as it would have been five years ago. I can remember only one woman among these artificial menopause cases who has had such severe hot flashes that I have been compelled to prescribe ovarian extract since 1921, but it is not the hot flash, the physical distress, that causes the terror. The attitude of the normal woman towards the hot flash is one of amusement. She describes it and then laughs about it. When on the other hand, she is worried about the significance or the consequences of the hot flash, it becomes a serious factor. In other words, we have a certain percentage of endocrine causes; we have a certain percentage of psychic causes. If the endocrine disturbance is the match that may set the conflagration going, I think it might be wise to eliminate it if possible, but this whole discussion is on the practical rather than the academic basis, and until such time as Dr. Frank does get this substance, I think we shall have to treat these women as they are. If they suffer from psychic disorders, they should be treated by psychotherapy.

In regard to ovarian extracts I agree with Dr. Frank in principle. Dr. Sharlit in our clinic at Vanderbilt is a chemist and has examined these substances by the ordinary chemical methods, determining the amount of protein, the amount of fat, etc. He finds that some manufacturers are selling what other manufacturers are throwing away.

The question whether or not these ovarian substances, when they do work, work by suggestion or by chemistry I am not prepared to answer. All I know is that a

lot of women have come to the Vanderbilt Clinic suffering from the spontaneous menopause. I religiously keep away from using it in artificial cases, because I believe that the taking of medicine suggests illness. But in the spontaneous cases who already have their discomforts (about 130 odd), large amounts of dry whole ovarian substance have been used. The distribution is such that it seems largely to eliminate suggestion. The hot flashes have been, I think, helped, but I agree with Dr. Frank that this matter of suggestion is so subtle and so difficult to appraise that we must accept the present commercial preparations with caution.

Atropine we have used spasmodically, but because we became so impressed with the psychic factors, we gave up the use of all drugs in these cases.

DR. J. H. TELFAIR reported a case of *Osteogenesis Imperfecta* noted in a baby born at term in a gravida ii, age 20, with a normal first labor and infant.

The present pregnancy was uneventful and the labor lasted about twenty-three hours. The baby was born in poor condition, cry weak, and body disfigured. The bones of the skull were for the most part cartilaginous and very brittle, breaking with extreme ease on slight pressure. Fontanelles and sutures were markedly enlarged and separated. The eyes were slit-like and the features approached the mongoloid type. The vertebrae appeared to be intact but the ribs presented numerous fractures and these likewise involved the long bones of both extremities, resulting in a marked shortening. The baby lived only three hours. The Wassermann test on mother was negative. The autopsy showed characteristic evidences of achondroplasia. The body cavities were essentially normal. A section of the femur showed the shaft to be of almost paper thinness with a large amount of extravasated blood. The epiphyses were normal, although the line was red and congested.

DISCUSSION

DR. HAROLD BAILEY.—I think there is no question that the case presented is typical of the condition. Ballantyne divides the group into several types: *A*, *B*, *C*, and *D*, and this specimen would possibly correspond to type *A*, chondromalacia micromelia or, more simply, achondroplasia. As a matter of fact about a dozen terms have been applied to this condition; the original one was congenital rickets, and certainly this specimen looks as though it might be of that nature.

This radiograph is very interesting, because it shows the peculiar head deformity characteristic of these dwarfs. The head is flattened from above downward and the jaw stands forward, thus giving a curious sinking in the region of the glabella. This head deformity is due to a shortened base of the occipital bone in front of the foramen magnum, so that the opening is far forward in the base of the skull. It is comparable to the formation existing in the bulldog. The skulls of this animal in Stockard's laboratory show plainly that the area in front of the foramen is very much shortened and is perhaps only about one-fourth the length in any other dog.

The deformity is inheritable. It is exceedingly difficult to bring up these dwarfs and they usually die during pregnancy, labor or shortly after birth. When they do come to adult life they are the strong dwarfs that we see in the circus and elsewhere. The condition pertains to teratology rather than to nutritional disturbances of the mother.

MEETING OF JANUARY 12, 1926

THE PRESIDENT, DR. O. PAUL HUMPHSTONE, IN THE CHAIR

DR. HERBERT THOMS presented a report of a case of **Fetal Dystocia Due to a Large Cystic Tumor**. (See page S39.)

DR. J. WHITRIDGE WILLIAMS, of Baltimore, read (by invitation) a paper entitled **A Statistical Study of the Incidence of Labor Complicated by Contracted Pelvis in the Obstetrical Service of the Johns Hopkins Hospital**. (See page 735.)

DISCUSSION

DR. JOHN O. POLAK.—This presentation of Dr. Williams must be classed as one of the best contributions we have had on this subject, for the reason that it shows what has been accomplished in lowering the maternal and fetal death rate by the evolution of scientific obstetrics. In looking at the figures as he threw them on the screen, I note that our knowledge of the ways of the black woman is too limited to permit us to discuss that part of his paper. From his statistics we find that the incidence of contracted pelvis in Baltimore in white women is not quite as high as the incidence of contracted pelvis in white women in and about New York. The incidence here is somewhere between 10 and 11 per cent. A type of pelvis that the doctor did not mention is that which we have been seeing so frequently in the last few years since the importation of that large group of war starved Russians. These women have normal external measurements with a high promontory and an increased pelvic inclination and have given us many of our difficulties in infravaginal delivery. Our experience has been practically the same as far as the incidence of the generally contracted pelvis and generally contracted funnel pelvis among white women is concerned.

Another interesting thing in the notation is that his figures are almost identical with ours as far as spontaneous deliveries in minor degrees of contraction in white women are concerned. In three series of cases of 100 each that we studied we found the incidence to be 79, 80 and 81 per cent, respectively, where the labors terminated spontaneously; this practically agrees with his 78 per cent. The interesting point is the very low maternal mortality that he has finally attained by the introduction of the methods that are now in use. Another point that is impressive from the charts is that high forceps has become obsolete, and that there is not among obstetricians today such an operation as high forceps. Furthermore, that instead of doing pubiotomy and version, which at one time seemed to be the trend of Baltimore, there has been a gradual trend towards cesarean section.

This paper would be a dangerous one outside a special society like this, as the doctor makes the statement that he is able, and has shown by the charts that he is able, in a very great proportion of cases practically to foretell exactly what the particular head is going to do in the particular pelvis without estimating the individual expulsive powers of the patient or the moldability of the head. The doctor's statement that his sections have gradually increased to nearly 10 per cent of the operative interventions is entirely in accord with our experience in New York; we are doing less of the test of labor; that prolonged test of labor hour after hour that we were giving our patients years ago is gradually being shortened. As a result we are delivering more living babies and have more living mothers. I am

still of the opinion that perhaps too many uteri are sacrificed in Baltimore, and yet I do not believe that this low cesarean operation is a panacea against the actually infected case. It is in the suspect case that it has its value, not in the actually infected case. When one stops to think for a moment that the involution of the uterus in any case of cesarean section is poorer than it is in the normal case, when one realizes that there is definite migration of the vaginal flora into the uterus after a certain number of hours, one can readily understand how leaving the uterus in these cases that are already potentially infected is fraught with a great deal of danger. Furthermore, there is no question that the convalescence of these cases of hysterectomy is smoother by far than even those in which the woman has a low section and is potentially, but not actually, infected.

DR. HAROLD BAILEY.—Under a plan of treatment—trial labor—with which I might say Dr. Polak disagrees, we have conducted at Bellevue, during the past four years, all our cases of contracted pelvis. As a result it has been necessary to do 47 low flap cesareans and 10 elective cesareans, and there was no loss of life to the mother.

The method by which Dr. Williams separated his cases was very interesting; along similar lines, our figures for New York would be very different, and I think that this is largely owing to the colored women with whom he has to deal. We found that there were very few pelves that we could actually claim as due to rickets, and to our great surprise, at the conclusion of our work, we found that we had almost exactly the same number of generally contracted pelves as flat pelves, and that there were only 10 per cent of all the contracted pelves that were funnel.

DR. J. WHITRIDGE WILLIAMS (closing).—In our series of 3,000 labors in contracted pelves there was a gross maternal mortality of 29, and we noted the interesting fact that 26 of the deaths were in black and only three in white women. But, as there were four times as many contracted pelves in the black women, if no peculiar factors were concerned, we should have had six or eight deaths in the white women, and yet we had only three. What is the explanation for this difference? I cannot tell you, except that I can say in a general way that the colored woman is a poorer risk than the white woman and has less resistance in any physical emergency.

That brings me to the very interesting question as to why it is that we have in America the highest maternal mortality in obstetrics of any civilized country in the world. If you had asked me the reason a year or so ago, I would have said that it was because the medical students in America had received the poorest obstetric training in the world; as until a few years ago there were no obstetric clinics worthy of the name, and that the subject was taught almost entirely didactically. On the other hand, when we take the differing mortality of the two races into consideration, it appears within the range of probability that some other factors may be concerned, and it is conceivable that the American women are less fitted to bear children than those of any other country in the world. Whether this is true or not, I cannot say; as it is a problem that can be solved only after careful statistical study of the results obtained by thoroughly trained obstetricians under the best possible circumstances, and such studies have not yet been made.

A word about radical sections in Baltimore. When we come to analyze them, it will be found that they were almost all performed on colored women who had entered the service in bad shape, or were done directly for purposes of sterilization at a second, third or fourth section.

There is a certain proportion of cases in which I regard it as the operation of choice and where I would not dare do anything else, regardless of the social status

of the patient. I do not think that the low flap operation will ever entirely replace the radical operation, although I think it represents a very considerable advance. Moreover, I believe that the article which Hofbauer has recently written, showing the existence of a peculiar protective mechanism at the base of the broad ligaments, gives a clue as to why the operation proves so satisfactory in what at first glance appear to be unpromising cases. When it was first discussed, I talked to Dr. Halsted about it, and he said he thought there could be no worse operation surgically, as there could be no better way of bringing about a spread of infection than by widely opening up the pelvic connective tissue. Nevertheless, experience has shown that it is a very satisfactory operation in appropriate cases, but we must guard against going to extremes, and we must bear in mind that we have always alternative operations. If you have carefully studied your patient and do a classical cesarean a day or so before the onset of labor the result should be ideal. If, however, you miss the time of election, the low cervical operation comes into play, but if the patient is not seen until infection has occurred, the radical section then becomes the operation of choice.

I think in a teaching institution, such as the one with which I am connected, we must constantly bear in mind that we are teaching inexperienced people who are prone to run away with what we say. Consequently, we must be prepared to justify every operation we do. If many obstetricians had the material that I have, with its large number of colored patients with contracted pelves, I think they would do many times more sections than I have done. I always try to impress upon the students the fact that it requires a great deal more intelligence to decide to let a woman have a spontaneous labor through a contracted pelvis than to do any operation, and I frequently quote Leopold's dictum: "The important thing is to fix the indication; operating is only handiwork—any carpenter can do it." Furthermore, we should always remember that every justifiable obstetric operation represents a failure on the part of Nature, and we must always be on our guard lest it represents a failure of our intelligence as well.

NEW ORLEANS GYNECOLOGICAL AND OBSTETRICAL SOCIETY

MEETING OF JANUARY 14, 1926

DR. W. L. STALLWORTH reported a case of **Full-term Intraligamentous Pregnancy.**

S. N., colored female, age, twenty-four years. Family and previous history irrelevant. Menstrual history without incident. One full-term pregnancy six years before, delivered in country by midwife. Child died of hemorrhage from the umbilical cord on the seventeenth day. First seen in the Touro Maternity Clinic October 28, 1924, with history of having missed her September period. Estimated confinement May 22, 1925. She did not return until February 4, 1925, at which time she presented the appearance of a woman normally four months pregnant. Quickening had occurred just prior to this visit. The Wassermann was weakly positive, and she was therefore given six 3 gm. doses of salvarsan in the G.U. Clinic, the treatment covering some eight weeks. She was kept under observation from February until June, during which time the pregnancy was apparently normal in every way. The urinalyses were negative and the blood pressure varied from 120 to 140 systolic. June 15 there was a sudden attack of severe cramping pains in the lower abdomen, radiating to the back and down the legs. This condition

persisted for two days, during which time she was nauseated and vomited frequently, and seemed very weak. As the pains simulated labor pains she was advised to enter the hospital, but refused to do so, and for some reason she was lost sight of until November 25, 1925, when she was examined in the Touro Clinic. Since June, when she was last seen, she had menstruated regularly every month, duration three to four days, and the flow was slight and without discomfort. Her general health was poor; she was sleeping badly, was very nervous, had frequent dizzy attacks, was short of breath on exertion, and tired very readily. She had lost 30 pounds in weight, her appetite and digestion were poor, her bowels constipated, and there was marked frequency of urination. Abdominal examination showed a firm, round palpable mass, extending as high as the umbilicus, and about the size of a six months pregnancy, on the left of the abdomen and freely movable. A smaller rounded mass, about the size of a large orange, was made out on bimanual examination to the right of the uterus and firmly fixed. A firm rounded mass, apparently the fundus of the uterus, could be made out on deep pressure behind the symphysis. A tentative diagnosis was made of fibroid tumor of the uterus, with the possibility of either an ovarian cyst or a pregnancy. Operation December 4, 1925, at Flint-Goodridge Hospital by Dr. Levy. A midline incision exposed a large, rounded mass, about the size of a football, which proved to be entirely retroperitoneal and within the broad ligament. The left tube extended almost over the vertex of the tumor, but the ovary on this side could not be located. Multiple adhesions were present. The tumor and the left tube were removed without difficulty. A right intraligamentary cyst was also removed, together with the tube of that side, which was involved in the mass. Usual closure, with one large rubber drain. The pathologist reported the condition as a full-term intraligamentous pregnancy.

DR. W. E. LEVY reported a case of Hemorrhage, Followed by Shock and Acidosis, with Immediate Recovery after the Administration of Glucose and Insulin.

About a year ago, with Dr. Henry Macheca, he reported in the *New Orleans Medical and Surgical Journal* a case of acidosis following acute hemorrhage. This patient had gone to a midwife to have an abortion done, and as a result was brought into the hospital practically exsanguinated. Her systolic pressure was around 78. She was transfused at once, with good results and considered out of danger. Next morning, however, she was vomiting profusely, and with a markedly sweetish breath. A catheterized specimen of urine showed acetone and diacetic acid. Her condition was obviously very grave. She was given glucose and insulin by hypodermoclysis, without results, and then 600 c.c. of glucose and 20 units of insulin intravenously. Six hours later she was on full diet, and her recovery thereafter was without incident.

Five days ago a similar case of shock occurred following hemorrhage from a retained placenta. After manual extraction, however, the hemorrhage finally ceased. By noon the patient was vomiting profusely, and urinalysis showed both acetone and diacetic acid. In short, acute hemorrhage produces exactly the same chemical changes in the body as does acute starvation. Glucose and insulin by hypodermoclysis failed in this case, as it had in the previous one, but 500 c.c. of glucose with 18 units of insulin intravenously produced exactly the same brilliant results. The vomiting stopped, the patient was put on full diet within a few hours, and her recovery thereafter was smooth.

DR. C. JEFF MILLER read a paper entitled **Glucose and Insulin in the Toxemias of Pregnancy**. (See page 763.)

DISCUSSION

DR. H. E. MILLER.—It has been my impression that the blood-sugar content in eclamptics is inclined to run low. A report from Johns Hopkins, by Stander and Duncan, however, states that in a study of some 13 or 14 cases it was found that the blood-sugar content was high, while the CO_2 combining power was low. Bearing this in mind, they have relied for their indications for this line of treatment upon the CO_2 combining power of the blood rather than upon the blood-sugar content, and they contend that a lowered CO_2 combining power may be promptly offset by the use of insulin alone. This is reasonable in view of the fact that if the blood sugar is high, there is no indication for glucose. The paper is purely a preliminary report, but if further investigations bear them out in their first results, their advocacy of insulin alone in such cases will be very convincing. In spite of results which they claim, however, I still believe, particularly in the instance of the average practitioner who is working in the home without laboratory aids, that the method is safer if glucose is used with the insulin. Insulin is a dangerous agent, unless enough glucose is used *with* it.

I might say in general that nothing could persuade me to consider again the old radical treatment for eclampsia. I cannot give you exact figures, but I know that in the last few months I have seen a relatively large number of women admitted to our service at Charity in convulsions or coma. We try to keep them absolutely quiet, in a darkened room, we give them opiates, not systematically according to the Stroganoff method, but according to the individual indications of each case, we bleed them where the blood pressure is persistently high or where there have been more than two convulsions, and we give them glucose and insulin by intravenous infusion. There is no sweating, no purging, and certainly no attempt at forced delivery. I do not recollect a single instance in which marked improvement has not followed this course of treatment. We are also getting away from the immediate induction of labor, even by the improved conservative methods, for this reason, if no other: if the patient is in such a condition that she is going to need morphia or opiates for eighteen or twenty-four hours, induction will be difficult if not impossible, and therefore time is really saved by waiting, particularly in view of the patient's improved physical condition.

DR. WALTER E. LEVY.—We have definitely proved that in the preeclamptic toxemias, and also in eclampsia, both the blood-sugar content and the CO_2 combining power are lowered. My report is based upon studies in some 50 cases, of which these are illustrations: blood sugar, 60.6, CO_2 combining power, 43; 76.8 with 38.3; 54.8 with 39.3; 57.1 with 37.4; 83.3 with 37.4. In these studies the blood sugar runs from 52 up, the highest being about 84, while the CO_2 combining power runs from 32.5 up. In looking up the literature of blood sugar, I found the report of a series of experiments by Mann of the Mayo Clinic. He took the livers out of a number of dogs, and in every instance he found that before death the blood sugar was practically cut in half, while the glycogen of the muscle was also depleted some 50 per cent. Now, to reason by analogy, if in a hepatectomized dog the blood sugar is low, and death ultimately ensues with convulsions and coma, why does not the same thing happen when we have a chemical destruction of the liver, as in eclampsia, which produces true hepatic destruction? Frank describes the process as a central necrosis, the debris being composed chiefly of liver cells, and I can see no difference between the surgical removal of a dog's liver and the chemical destruction of a woman's liver by process of disease. In both instances the fats are incompletely burned, acetone and diacetic acid develop, and a state of

acetonuria results. I think Dr. Miller is entirely correct in his advocacy of glucose and insulin in these toxemias; the liver function, as a result, returns, and the glucose seems to stay further liver destruction. Administration by hypodermoclysis gives no results; I have proved this in a series of cases where immediate results followed administration by infusion, with the insulin given subcutaneously.

If these new investigations of mine are correct, our diet in toxemias in the past has been wrong. We tell our patients not to eat meat or eggs, advocating fats and sugars. Fats should be eliminated from the diet, because they are incompletely burned, and proteins in moderation should be permitted. Heretofore we have given our patients lactose to build up their carbohydrate reserve, but Mann in his investigations found that it had no effect at all upon dogs. I cannot agree with the report from Hopkins in the December issue of the *AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY*, to which Dr. Miller has referred. In my opinion you cannot have an acidosis in the face of a high blood sugar. I might add that in doing this work I ran across a German article which stated that acetone bodies could be found in the blood of the normal pregnant woman, showing the tendency to an already existing acidosis.

DR. J. S. HEBERT.—Dr. Paul Titus, of Pittsburgh, in the August, 1925, issue of the *Journal of the American Medical Association* states that glucose not only supplies the necessary element for a liver which is defective functionally, but actually regenerates liver cells. Certainly in any discussion of this line of treatment that point should be emphasized.

DR. T. B. SELLERS.—I have used glucose alone, as well as glucose and insulin, in the treatment of the early toxemias of pregnancy particularly, and I think there is no question but that the combined treatment gives better results than the glucose alone. Thalhimer believes that in pregnancy there is a fundamental change in the carbohydrate metabolism, and not merely a carbohydrate deficiency, as Titus claims, and I am inclined, from my experience, to believe that Thalhimer is correct. Three years ago I reported before the Orleans Parish Medical Society a case of pernicious vomiting of pregnancy in which glucose alone was used. After the administration of the glucose the urinalysis showed 4 per cent of sugar. Her toxemia increased, however, and she died three days later. I am convinced that insulin would have given her a much better chance for recovery.

DR. MILLER (closing).—As a general thing I should certainly urge the use of insulin whenever it seems indicated, even without definite laboratory data, with the addition of glucose as a preparation for the hypoglycemia likely to follow. With prompt service from the department of biochemistry, and the liver function tests now possible, we shall have great assistance in reaching scientific conclusions as to the indications for treatment in these cases. Now we have to rely upon the clinical condition of the patient. Has the liver reached its limit of function? How seriously is it embarrassed? What are the limits of safety of the CO₂ combining power of the blood, and how are we to know when these limits have been reached? Such questions can only be answered in the laboratory, and until they are answered promptly our treatment must be given on the gross clinical indications and must remain correspondingly empirical.

DR. PHILIPS J. CARTER read a paper entitled **The Vomiting of Pregnancy, Its Causation and Its Treatment.** (See page 828.)

DISCUSSION

DR. J. S. HEBERT.—I noted that Dr. Carter in his classification of types of vomiting included the reflex type. Dr. Williams in his older textbooks gave the three classifications of neurotic, reflex and toxemic vomiting, but in his recently revised

edition he has dropped the reflex classification. We all have had our particular way of treating this distressing condition, but we are agreed, I think, that the specific method is still to be discovered. In the last few years I have used the plan advocated by Titus of Pittsburgh. He classes his cases as mild, moderately severe and pernicious, and he has three types of treatment based on this classification. In the mild cases he seeks to win the confidence of the patient, encouraging her to believe that the condition is a temporary one which will soon disappear, and he prescribes correspondingly simple measures. Liquid food is taken every two hours, or possibly some solid food with a highly concentrated carbohydrate content. In addition he suggests a solution of 10 per cent glucose and two per cent bicarbonate of soda, to be taken in 2 oz. doses every two hours. He stresses particularly the regularity of both food and medication. The moderately severe cases are treated along the same general lines, with the addition of Murphy drips or hypodermoclysis as indicated, and 10 grains of chloral and 30 grains of potassium bromide twice daily. The pernicious cases are treated vigorously at once, and the administration of glucose intravenously seems to control this type in his hands.

DR. P. B. SALATICH.—I would like to substantiate what Dr. Carter has emphasized, that in using ovarian extract for this condition, ordinarily we do not give enough of it. If one ampule a day gives no results, I give the same dosage two or three times a day, and I have occasionally given two or three ampules at a dose. I can recall only one instance in which I failed to stop the vomiting; in that case the patient would not follow my advise in any respect, and I finally refused to continue treating her. Glucose, with or without insulin, has, since its introduction, made the handling of the serious cases of pernicious vomiting a much simpler matter, but in the average case I think you will find that ovarian extract does the work if you will saturate your patient with it.

DR. JOHN F. DICKS.—I have used both corpus luteum and ovarian extracts quite extensively in treating the vomiting of pregnancy, but my results have not been striking, possibly because my dosage was too small. I have given as much as 1 c.c. every day for twelve or fifteen days, and occasionally a patient has been benefited, but as a general thing my results have been disappointing. The point which Dr. Carter emphasizes, that the patient should be saturated, may have something to it. The cases he reports are certainly remarkable, and if saturation is responsible for them, our small dosage may explain our failures.

DR. T. B. SELLERS.—In 1922 I reported before the Orleans Parish Medical Society a series of cases of vomiting of pregnancy which had been treated by ovarian extract or lutein, intravenously, intramuscularly or by mouth for from fifteen to twenty-eight days; my results were so poor that I did not feel justified in continuing the treatment. Dr. Carter's advocacy of saturating the patient with ovarian extract may explain my failures. I would advise the use of glucose and insulin in all toxic cases; since I began to use this method I have not had a mortality, nor have I had to empty the uterus. The treatment, however, should be instituted early, before the pronounced symptoms of toxemia develop.

DR. A. H. GLADDEN JR.—Can you compare a series of cases treated by ovarian extract alone with a series treated by the extract plus the luminal-sodium? And how much of your good results do you attribute to the latter agent?

DR. CARTER. (closing).—I have been working on this subject of the vomiting of pregnancy since 1915. I began, as I have said, with the tablet form of ovarian substance, because in those days the extract was not available. After the expenditure of considerable time and effort I finally persuaded a local firm to put up the fluid form, and since 1918 I have used that preparation. As a matter of fact, I

was so thoroughly convinced that this would be the most effective form that I finally told the pharmaceutic houses I would quit using the preparation altogether if I could not get the form I wished. In the paper I read on this subject at Alexandria I reported 40 cases with 100 per cent good results. In a few cases I have used corpus luteum in ampule form, but the percentage of cures has not been encouraging. Glucose and insulin should be used immediately in a serious case. In the last case I reported, in which abortion was eventually done, I used it first by hypodermoclysis, and twice intravenously, with no results at all, and I believe that the condition was an incipient, recurrent acute yellow atrophy of the liver. The urinary findings were characteristic, she began to turn quite yellow, and I did not feel that further delay was justifiable.

I have not had such good results with corpus luteum as with the whole ovary. If corpus luteum gives such results as Hirst in particular claims for it, then we may reasonably expect the whole ovary to give better results, and it was with that idea in mind that I began this form of treatment. The secret of the method is saturation. It must be administered regularly every day, without skipping, and in bad cases I have given 2 or 3 ampules in a day. In view of the good results I have had with this mode of treatment, I would say that the theory of the ovarian hormone is a reasonable one.

In answer to Dr. Gladden, I have not checked two series of cases, one with ovarian extract alone, and one with the extract plus luminal, but my theory is this: if the case does not respond to ovarian extract, which is directed, so to speak, at the factor concerned in the pregnancy, then there is evidently a digestive factor present, or a neurosis, and luminal in either condition exerts a sedative action. After the vomiting is checked by the action of the ovarian extract I continue the luminal for its sedative effect. I am not advocating this treatment as the specific for this condition, but until we know the underlying cause of the vomiting and can treat that cause, we are justified in using any method which gives results, and in my hands the treatment I have outlined has been very satisfactory.

The final installment of the Transactions of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons will appear in a subsequent issue.

Item

American Gynecological Society

At the last meeting of the American Gynecological Society, the following officers were elected:

President—Dr. Arthur H. Curtis, of Chicago, Ill.

First Vice-President—Dr. Frank W. Lynch, of San Francisco, Calif.

Second Vice-President—Dr. James R. Goodall, of Montreal, Canada.

Treasurer—Dr. Fred L. Adair, of Minneapolis, Minn.

Secretary—Dr. Floyd E. Keene, of Philadelphia, Pa.

Department of Reviews and Abstracts

CONDUCTED BY HUGO EHRENFEST, M.D., ASSOCIATE EDITOR

Collective Review

The Obstetric Literature of 1925

BY J. P. GREENHILL, B.S., M.D., CHICAGO

(Continued from May Issue)

LABOR

THE preparation of patients for delivery varies considerably in different institutions. Siddall⁸⁶ describes the technic used at the Henry Ford Hospital. After clipping the pubic and vulvar hairs, a diluted tincture of iodine solution (2 per cent) is applied to the vulva, perineum, lower abdomen, and inner sides of the thighs. Much better results are obtained with this preparation than with the usual scrub and flush preparation. Mayes⁸⁷ made a study of cases to compare mercurochrome and iodine as antiseptics in the preparation of patients for labor and came to the conclusion that mercurochrome is preferable to iodine.

The usual scrub and flush preparation gives very good results if properly carried out, but unfortunately not all nurses know how. A good procedure is to have the patient shaved and given the usual scrub and flush preparation when she starts in labor and an application of iodine or mercurochrome just before the actual delivery.

Analgesia and Anesthesia.—The matter of analgesia in obstetrics always requires consideration because of its importance. Undoubtedly the greatest advance in recent years has been the method suggested in 1923 by Gwathmey (morphine-magnesium sulphate injections and colonic ether instillations). Nearly all who use this method report very good results. Davis⁸⁸ gives a very clear and comprehensive synopsis of the method and emphasizes certain important precautions. Harrar⁸⁹ is convinced that the Gwathmey procedure is the safest and most effective method for the relief of labor pains. Others (Gwathmey and Hooper⁹⁰) also report excellent results, but there are a few dissenters. Lörincz,⁹¹ of Hungary, believes that the method is not harmless. However, Gwathmey's answer⁹² to this is that at the New York Lying-In Hospital where over 200 patients receive this form of analgesia every month, no harm has been seen in either the mother or child. Another dissenting opinion is that of Beckman⁹³ who performed experiments on dogs to test the alleged synergism of magnesium sulphate and morphine and concluded that there is no synergism in dogs and that no satisfactory proof to show this synergism in man has been presented. Gwathmey⁹⁴ answers this by submitting evidence to show that synergism does occur in man and that

it has been established in the albino rat, rabbit, and dog also. In spite of this, Beckman⁹⁵ does not accept the evidence as proof of synergism.

In 135 cases studied by Fuchs,⁹⁶ twilight sleep failed in nearly 4 per cent, 18 per cent of the babies were born oligopneic, 6 per cent were apneic and 3.7 per cent were both apneic and asphyxiated. Labor lasted longer than usual. Carter⁹⁷ substitutes pantopon for morphine to eliminate headache, nausea, and vomiting.

King⁹⁸ points out the advantage of ethylene-oxygen over ether and nitrous oxide as an anesthetic in obstetrics. He has not noticed any undue tendency to postpartum hemorrhage, but this complication has been seen by others, including the reviewer. Not only is the blood of the mother changed but also that of the infant as recently proved by Sanford.⁹⁹ The danger of explosion from static electricity need not be feared if the patient and machine are grounded, if a water-washing inhalant machine is used, and if the rubber parts are coated with Zeppelin paint.

Three cases of delayed chloroform poisoning are reported by Royston¹⁰⁰ who, in spite of these cases, still feels chloroform is a safe anesthetic in obstetrics. Patients who have long, exhausting labors and who take little food during this time, should not be given chloroform. The dangers of chloroform have from time to time been emphasized; but despite this, the drug is still popular in obstetrics though very seldom used in general surgery. Chloroform should never be used for a long period of time and, if used at all, calls for a diet rich in carbohydrates and milk and restricted in fats, before the anesthetic is given (Stander¹⁰¹).

Febres¹⁰² advocates injection of the Frankenhaüser ganglia to produce anesthesia in labor. Rucker¹⁰³ feels that novocaine injected sacally produces marked relaxation of the perineum and the external os, with anesthesia to pain and also largely to pressure. He believes it is an excellent procedure for operative obstetrics, but its value for spontaneous delivery is dubious.

There is no doubt that intraspinal anesthesia is dangerous, especially for pregnant women (Krönig), and while epidural anesthesia is apparently harmless, occasional bad results have occurred. Where a spontaneous delivery is anticipated, neither intraspinal nor epidural anesthesia should be used. For forceps delivery where a general anesthetic cannot be used, direct infiltration (novocaine) anesthesia, with or without morphine, gives good results.

Complications.—In order to estimate the true value of the passage of meconium as a sign of fetal distress, Schulze¹⁰⁴ studied 5534 obstetric cases and found that meconium appeared in the amniotic fluid in 3 per cent. The author concludes that the passage of meconium during labor is in the large majority of cases entirely independent of fetal asphyxia. In cases associated with asphyxia, changes in the fetal heart tones are invariably present, and the latter, therefore, should be the sole guide as to the necessity for operative interference. Adams,¹⁰⁵ who studied the effect of a short umbilical cord on labor, believes that in by far the great majority of cases, a short cord causes neither dystocia nor danger to the fetus, and although this condition exists as a potentially dangerous complication, it only rarely necessitates operative interference.

Very little has been written this year on the use of pituitrin in labor. However, Laurentie¹⁰⁶ reports a death due to pituitary extract,

and Rucker¹⁰⁷ describes a case of incomplete tetanus (demonstrated by a hystero-gram) which was produced by so small a dose of pituitrin that no action was observed clinically. Nowadays it should not be necessary to emphasize the dangers of pituitary preparations in the first and especially the second stage of labor.

Operative Obstetrics.—In a discussion on birth injuries, Stern¹⁰⁸ calls attention to the importance of spontaneous nystagmus as a sign of cerebral damage and advocates more frequent use of operative procedures for the sake of the baby. He advises that forceps be applied after the fetal head has remained on the perineum for three hours. Rittershaus¹⁰⁹ tells us that at the Freiburg Clinic the indications for forceps at present are uterine atony, a second stage of four hours, threatened infection, fever, acute infection, heart failure, and a fetal heart rate of less than 100 during a pause between uterine contractions. Since instituting the four-hour rule for the second stage, the number of forceps operations has increased, but the fetal mortality has decreased. There was no increase in maternal mortality or morbidity.

This is gratifying information because of the previous ultraconservatism of this clinic. There is no doubt that the dangers of the second stage are greater than those of the first. This calls for careful control of the fetal heart tones during the second stage and interference when the heart tones indicate danger. Since delay in expulsion of the child after a few hours endangers the child, it is advisable for the expert to apply forceps soon after complete dilatation of the cervix provided the head is on the pelvic floor and the occiput is anterior.

Both Jarcho¹¹⁰ and Scadron¹¹¹ extol the Kielland forceps. Two years ago the reviewer¹¹² abstracted the literature on the subject and indicated that the large majority of obstetricians who used this forceps felt the instrument was a definite advance in obstetrics. The reviewer has had no cause to change the opinion expressed in the Collective Review which was summarized as follows: "I feel that the Kielland forceps are distinctly helpful when the head is above the spines of ischia and also when the head is engaged, but where the occiput is not in an anterior position and cannot be brought into an anterior position manually. Where the head is engaged and the occiput is anterior or can be rotated anteriorly with the hand, I believe better results can be obtained with the Simpson forceps." More important than the type of forceps is the man performing the operation.

For occiput posterior positions B. C. Hirst¹¹³ advocates the Scanzoni maneuver, while Bill¹¹⁴ recommends a modification of this maneuver. The reviewer favors rotation with the hand rather than with forceps, because by means of the hand not only may rotation be accomplished easily in most cases, but it is also possible to correct a deflection attitude and asynclitism. Whenever rotation of the head is undertaken, whether manually or instrumentally, it is advisable to lubricate the vagina liberally with green soap.

In a series of 1000 deliveries, Johnson¹¹⁵ performed 445 podalic versions by Potter's method. The fetal mortality was 2.4 per cent. Johnson regards the Potter version as a most valuable method of delivery when done on the proper cases, at the right time, and by one who knows how. While agreeing that the Potter way of performing version and extraction is probably the best, because it combines all

the good points previously suggested for the performance of this operation, it is not hard to understand why the vast majority of obstetricians refuse to terminate most labors by a major operation. Nevertheless, Potter has made a definite contribution in reviving the operation of version and extraction.

During the past year much has been written on the low or cervical cesarean section. DeLee¹¹⁶ reports 330 of these operations performed by various operators at the Chicago Lying-In Hospital. There were only 2 maternal deaths, one from peritonitis and the other from pneumonia. During the same period of time 136 classic cesarean sections were done by the same operators with 7 maternal deaths. DeLee claims the following points of superiority for the cervical operation (laparotrachelotomy) over the classic: a decidedly lower mortality, a decidedly lower primary morbidity, a greater guarantee against rupture of the uterus in subsequent pregnancy and labor, a greater guarantee against intraperitoneal adhesions, fewer hernias, the permissibility to extend the indication for abdominal delivery to cases of neglected labor, even when infection is suspected, and the possibility of giving the parturient a real test of labor before concluding that abdominal delivery is necessary. In another paper DeLee¹¹⁷ points out the advantages of using local (infiltration) anesthesia for the cervical cesarean section. The method is described in detail and the results in 67 cases are analyzed. DeLee is of the opinion that local anesthesia is not only possible but should be the method of choice for all cesarean sections including the cervical. The dangers of acidosis and pneumonia are avoided and the postoperative recovery is smoother and quicker than that following general anesthesia. In heart, respiratory, kidney and liver cases it is particularly valuable, indeed almost indispensable.

Armitage¹¹⁸ reports 31 cervical cesarean sections with one death, while among 21 classic cesarean sections he lost 5 mothers. There are very few articles in the French literature on the cervical cesarean section. Fleurent¹¹⁹ reports 10 of these operations, of which 6 were "unclean." In two of the latter, forceps had been attempted before operation. One mother died (in the "unclean" series). In discussing this paper Hamm¹²⁰ mentioned that he had performed 18 of these operations with excellent results. In 16 of them he had used local anesthesia.

Attention is again called by Greenhill¹²¹ to a special group of women, most of whom require cesarean section. The typical patient in this group is a heavy-set woman with masculine and hyperpituitary characteristics. Her external measurements are usually large, but the available space in the pelvis is somewhat smaller than normal and her extremities are short. There may be a family history of dystocia and the patient's own history may indicate abnormalities in the sex life. The patient usually goes beyond term, and the fetal head, which is hard and in an occiput posterior position, remains high even after many hours of labor. The membranes often rupture before the onset of pains and the latter are usually irregular. When delivery is attempted from below, the result is often disastrous to the child and injurious to the mother. In view of this danger it is advisable to do a cesarean section to deliver a living and uninjured child. Since many of these cases are not recognized until after a long test of labor,

it is hazardous to perform a classic cesarean section; hence the cervical operation should be done.

A study of three scars from human uteri and uterine scars of pregnant guinea pigs leads Schwartz and Paddock¹²² to conclude that the most important thing in the technic of elective cesarean section is to obtain good wound approximation with a minimum of suturing and with as little tension on the sutures as possible.

Schmidt¹²³ reports 11 hebosteotomies with one maternal and two fetal deaths, and 23 symphyseotomies with 3 maternal and 3 fetal deaths. From a review of the literature on hebosteotomy, Le Lorier¹²⁴ comes to the conclusion that the subcutaneous operation is superior to the open operations. The results are the same for both subcutaneous hebosteotomy and subcutaneous symphyseotomy. From a similar review of the literature, Rossier¹²⁵ concludes that the following are the proper indications for pelviotomy (symphyseotomy and hebosteotomy): (1) contracted pelvis; (2) excessive size of the baby with non-engagement of the head or lack of progress in a normal pelvis; (3) slow dilatation of the cervix after rupture of the membranes, no progress in dilatation for three hours, or when after dilatation the head does not progress after two hours of good pains; (4) persistent defective cephalic presentation, such as face presentation and asynclitism.

Were obstetricians to perform pelviotomy for the above indications, the number of such operations would be enormous and the results dubious. In this country very few pubiotomies are performed because most obstetricians prefer to do cesarean sections. When a patient has been in labor a long time, especially after rupture of the membranes and vaginal examinations, the cervical cesarean section should be done because the classic operation is fraught with danger in these cases. Where there is frank infection, a subcutaneous pelviotomy may be performed; but a Porro operation or a craniotomy may be preferable, depending upon the conditions present.

Uterine Hemorrhage.—A new diagnostic sign of placental separation is described by Klein.¹²⁶ The sign is elicited by asking the patient to press downward as if she were defecating. If the umbilical cord descends and remains at its point of descent after the woman ceases to bear down, the placenta has separated. If the cord moves back into the vagina when pressure is stopped, the placenta is still attached. This procedure is somewhat similar to the method described a few years ago by Baer,¹²⁷ who utilizes increased abdominal pressure to expel the separated placenta.

In a very elaborate monograph prepared for the German Gynecological Congress held in Vienna last June, Stoeckel¹²⁸ reviews not only the literature regarding postpartum hemorrhage but also analyzes 971,487 labor cases about which he gained information through questionnaires. The monograph is divided into two parts, that which concerns itself with the normal and that which relates to the pathologic third stage of labor. Stoeckel regards the third stage as normal when the placenta is separated by uterine activity alone and is expressed by abdominal pressure or by the Credé maneuver. The upper limit of blood loss is 500 c.c. Bleeding in the third stage is physiologic and a bloodless course is just as abnormal as a hemorrhage. The most certain signs of complete separation of the placenta are changes in position and shape of the uterus. If the placenta does not separate in three to four hours it should be removed manually. Retention of the

separated placenta is due to mechanical or medicinal maltreatment of the uterus and to tubal corner placentas. Among the 971,487 labors, 582 women died of hemorrhage (0.6 per cent) but only 0.28 per cent died of pure atony (hypotony is a better term). The others died of rupture of the uterus, placenta previa, etc. In the prophylaxis of atonic bleeding, hypophyseal preparations give unfavorable results (0.7 per cent hemorrhages). Massage is the best uterine stimulant. Manual removal of the placenta should be done earlier and more frequently than it has been done. The uterus should be investigated immediately for missing pieces of placenta; because the longer one waits the worse the prognosis. The mortality of those who employ uterovaginal tamponade for atony of the uterus is twice as great as the mortality of those who do not use this procedure.

There are a number of statements in Stoeckel's monograph which are at variance with the experience of some obstetricians. For example, the last sentence in the above abstract. It is certainly not universal to have such bad results with uterovaginal tamponade unless the latter is not properly performed. In packing a uterus one must take every precaution to maintain asepsis for this is of the utmost importance. Many a man loses his head when he sees profuse bleeding and in his haste to check the bleeding disregards asepsis. Furthermore, the uterovaginal tract must be packed evenly and tightly to obtain the proper result. Exception may also be taken to the statement that hypophyseal preparations give unfavorable results in atonic bleeding. In many institutions where pituitrin is given after the delivery of the child, there has been a very definite decrease in the incidence of postpartum hemorrhage and manual removal of the placenta. In a clean hospital, particularly if it is a maternity and not a general hospital, an obstetrician need not wait three or four hours to remove a placenta manually; but strict asepsis must be maintained. However, in the home or in a hospital of questionable cleanliness, where patients are delivered in rooms in which "pus cases" are also treated, manual removal of the placenta is a most serious operation because of the great danger of infection.

The retention of pieces of placenta in utero late in the puerperium is a most dangerous complication. Among 41 such cases at the Prague Clinic, the mortality was 27 per cent. Because of the seriousness of placental remains, Wagner¹²⁹ favors the Mojon-Gabaston method of turgescence of the placenta. In two-thirds of the cases, where pieces of the placenta were retained, there was no bleeding to indicate retention. Since even inspection of the placenta does not always reveal that pieces are missing, the author advocates Küster's milk test (injection of milk into the umbilical vein after delivery of the placenta). If there is any suspicion that placental tissue remains in the uterus, the latter must be explored without delay; for the retention of placental tissue is far more dangerous than invasion of a recently emptied uterus. Pankow¹³⁰ is of the same opinion.

The reviewer agrees with both authors but would like to emphasize that undue manipulation of the uterus before the placenta has separated, as well as the Credé maneuver, may cause not only severe hemorrhage but also retention of pieces of the placenta. Still greater damage can also be done, as evidenced by the experience of Kutter,¹³¹ who reports 3 cases of rupture of the uterus. One of these was due to

manual removal of the placenta, but the other two were due to forcible Credé expression.

A paper containing very sound advice regarding the treatment of hemorrhage in the last trimester of pregnancy was written by Burgess.¹³² This article is especially valuable for the general practitioner.

The treatment of placenta previa must of necessity vary with certain factors, such as the environment, the size of the baby, the amount of hemorrhage, the amount of cervical dilatation, and the skill of the obstetrician. In a study of 254 cases of placenta previa, Watson and Miller¹³³ found that the best results for mother and child were obtained by the two extreme methods of treatment, namely, (1) conservative—no interference or only a minimum of it in the form of rupture of the membranes or using a vaginal pack, and (2) radical—in the form of cesarean section. It was in the cases treated by intermediate methods that the high mortality occurred. The authors feel that the scope of cesarean section might legitimately be increased in order to diminish the present high maternal and fetal mortality. C. J. Miller,¹³⁴ on the other hand, believes the argument that the fetal mortality in placenta previa will be markedly diminished by cesarean section is fallacious and, since this is so, any additional maternal risk for the sake of the child is unwarranted.

C. J. Miller's statement should not go unchallenged. At the Chicago Lying-In Hospital, 23 cases of placenta previa were delivered by cesarean section. All the babies were born alive and left the hospital in good condition except two. One of the latter was an anencephalic monster and the other was macerated. Both of these conditions could have been determined before operation by means of the x-ray as emphasized by Greenhill¹³⁵ a few years ago, when he pointed out the association of fetal monsters with placenta previa.

Ballhorn¹³⁶ found that 20 per cent of all patients who were tamponed at home, developed puerperal fever and in half of the cases the tampon was ineffectual in stopping hemorrhage. He found that cesarean section gave the best results. Houël and Jahier¹³⁷ treated 3 cases of placenta previa by the Simpson method, which consists in freeing the entire placenta from the uterine wall before delivering the child. One patient died.

Williams¹³⁸ gives a critical analysis of his experience with premature separation of the normally implanted placenta. Among 9000 cases at the Johns Hopkins Hospital, premature separation of the placenta occurred 57 times, while placenta previa occurred 64 times. The last 40 cases of premature separation of the placenta are analyzed, and of these, one-quarter were under twenty years of age which is in contrast to placenta previa. Twenty-three of the 40 cases required operative assistance; among these were 10 cesarean sections, in all of which the uterus at the time of operation presented the characteristic purplish-bluish metallic discoloration of its walls—the so-called uteroplacental apoplexy. Histologic examination showed intramuscular hemorrhage more pronounced in the outer layer of the uterine wall, hence the blood could not have been forced into the muscularis as a result of increased intrauterine tension. There is nothing in Williams' material to support the traumatic origin of premature separation of the placenta. No case of cesarean section showed marked twisting on its vertical axis. Williams says that, as far as he is aware, a case report of Polak, in which the cesarean section in-

cision lay near the insertion of one round ligament, is the only evidence adduced to support Morse's contention that torsion of the uterus can produce hemorrhagic lesions. Recently Greenhill¹³⁹ reported a case of uteroplacental apoplexy in which a Porro operation was performed. The uterine incision which had been made in the lower uterine segment and lower part of the fundus was alongside of the left broad ligament; but the dextrorotation did not seem to have any connection with the pathologic condition.

The majority of authors feel that toxemia of some kind is responsible for most cases of premature separation of the placenta; but 15 of Williams' 37 patients who survived had no albuminuria at all during the puerperium. The exact etiology, according to Williams, is still unknown. If the cervix is fully dilated or dilatable, Williams advises that delivery should be promptly effected by the most conservative means. If the cervix is not fully dilated, the bleeding profuse or concealed, and the patient shows signs of excessive loss of blood, cesarean section should be done. Supravaginal operation is necessary only if the uterus remains flabby. Phaneuf¹⁴⁰ reports two cases of uteroplacental apoplexy and reviews the literature.

PUERPERIUM

A number of papers appeared on the etiology and treatment of puerperal sepsis. Bigger and Fitzgibbon¹⁴¹ found that while certain cases of puerperal sepsis are due to staphylococci, *B. coli* and other bacteria, the majority are attributable to streptococci. The authors found streptococci in the vaginas of 68 per cent of the cases examined, hence these bacteria may be regarded as belonging to the normal flora. The commonest form of puerperal sepsis, that due to hemolytic streptococci, is caused by exogenous infection. Sepsis due to nonhemolytic streptococci is an endogenous infection of which the cause is the streptococcus of the vagina plus some unknown factor.

DeLee¹⁴² reports a case of puerperal peritonitis treated by lymphaticostomy. Although the patient died, there was a definite improvement after the operation and DeLee feels that the amount of drainage which occurred indicates there is a future for this operation in cases of peritonitis. Descarpentries¹⁴³ praises highly the reinjection of the patient's own hemolyzed blood for cases of puerperal sepsis.

Although there have been some good results in the treatment of puerperal septicemia by means of the intravenous use of mercurochrome, Piper¹⁴⁴ says that the results in general are most discouraging. He feels that there is some unknown factor which must be determined before we can successfully eradicate blood stream infection.

It has been shown experimentally and clinically that acroflavin, gentian violet, and mercurochrome in concentrations compatible with life, irritate the liver, kidney and heart and injure these organs. On the other hand, in the treatment of puerperal infection, Polak¹⁴⁵ is of the opinion that blood transfusions in quantities of from 200 to 300 c.c. typed and matched, are indicated.

The experience of Piper and Polak is the experience of most obstetricians, for intravenous medication in puerperal sepsis has not only done practically no good but has in several instances caused harm. The less that is done to a patient with puerperal sepsis, the better her

chances for recovery. The important thing is to build up the patient's resistance by fresh air, sunlight (including the use of quartz and other lamps), appetizing nourishment, tonics, etc. If pus is present, drainage should be secured. The uterus should not be invaded unless there is hemorrhage. Blood transfusion is a very valuable aid but should be used with caution.

Ott¹⁴⁶ recommends that the vagina be disinfected in all labor cases. Usually this is a dangerous procedure; but in long labors, especially where there is intrapartum fever, it may help to flush the vagina with mercurochrome a number of times during labor.

NEWBORN

By improving and changing somewhat the Abderhalden pregnancy reaction, Lüttge and v. Mertz¹⁴⁷ last year sought to determine the sex of the fetus in utero. They found that testis extract produced a reaction in the blood of women who gave birth to boys. Schmidt-Ott¹⁴⁸ verified this work and was able to determine the sex correctly before birth in 90 per cent of the cases.

While the older authors believe that nearly every newborn developed jaundice, it is now known that the number of babies showing icterus has considerably diminished, due to the modern conception of the principles of asepsis and the better care of the newborn. Hilgenberg¹⁴⁹ found that, at the Marburg Clinic, 68 per cent of the newborn developed icterus. Operative deliveries were found to favor the occurrence of jaundice.

The last statement is true but does not apply to cesarean sections, for not many babies born by cesarean section have jaundice, unless the operation is done after a long labor. Babies born after long hard labors show jaundice, regardless of whether delivery was spontaneous or operative.

In an editorial¹⁵⁰ on the production of congenital and hereditary malformations through irradiation, the conclusion is reached that the actual danger of developmental defects from irradiation of child-bearing women is not so great as to represent a contraindication to this form of therapy for conditions in which it is seriously needed; but the potential danger is real enough to discourage irradiation when the indications for its use are not urgent or when the prospects of actual benefit are at all doubtful.

McCandlish,¹⁵¹ who studied an epidemic of 224 cases of impetigo in the newborn, believes that this condition and exfoliative dermatitis are the same disease and are due to the *Staphylococcus aureus*. This infectious disease is also contagious and has a self-limiting course with a tendency toward spontaneous recovery. Mellon, Caldwell, and Winans¹⁵² attempt to show that the breast milk of certain mothers may contain large numbers of *Staphylococcus aureus*, thus constituting a possible source of infection for the newborn. The authors believe that the evidence submitted is at least presumptive that certain outbreaks of pemphigus neonatorum are traceable to an initial case infected by the mother's milk. Cannot the child infect the mother?

Grulee¹⁵³ feels that the best treatment for intracranial hemorrhage is absolute quiet and rest because the damage is done before any measures of relief can be of value. Sharpe and Maclaire,¹⁵⁴ however,

believe that early lumbar puncture, as both a diagnostic and therapeutic measure, is of great benefit.

In a collective review, Ehrenfest¹⁵⁵ analyzes the new information gained during the last three years concerning the causation and sequelae of intracranial birth lesions. He emphasizes that approximately one-half of all infants, either stillborn or dying within the first few days of life, at autopsy reveal some sort of laceration of the dura mater or more particularly the tentorium. Hence, we should consider with greater concern every artificial method of hastening the expulsion of the fetus, especially if we know it to be premature. Haste of any kind may imply a risk to the child far greater than the possible benefit the quicker delivery is expected to offer to it. Berberich¹⁵⁶ experimentally produced typical cephalhematomas and intracranial hemorrhages by applying a suction apparatus to the head of newborn animals. The brain changes were exactly like those found by Schwartz¹⁵⁷ in 65 per cent of newborn babies and offer more confirmation of the injury which occurs during labor, normal as well as pathologic.

Among 81 cases of pyelitis in pregnant women studied by Naujoks,¹⁵⁸ one-third of the babies were lost. The causes of fetal death may be the production of uterine contractions by the toxins and fever or direct injury to the fetus in utero, by bacteria and toxins.

From a study of 450 autopsies on newborn babies, Adair¹⁵⁹ concludes that in order to reduce the loss of fetal life we must furnish proper prenatal care, must conduct labor to lessen fetal trauma, and must so conduct the postnatal stage that the newborn infant is subjected to a minimum of exposure and the least possibility of infection. An analysis of 500 autopsies on stillborn and newborn babies by Johnson and Meyer¹⁶⁰ showed that 19.4 per cent had pneumonia and that 13.6 per cent were probably infected before birth. The great majority of these cases were probably due to aspiration of infected amniotic fluid following infection of the amniotic sac after premature rupture of the membranes. The danger of this infection was disproportionately greater for the child than for the mother.

During the last three years a number of articles have appeared hailing lobelin as a sovereign remedy for the treatment of fetal asphyxia. However, Jacobi and Walbaum¹⁶¹ and also Menner¹⁶² show definitely that this drug is dangerous at times.

Plass and Matthews¹⁶³ found that the amino acid nitrogen is constantly higher in the fetal whole blood and plasma than in the maternal samples. The amino acids which are probably necessary for the synthesis of proteins in the fetal organism thus behave as do the other constituents which are essential to growth (calcium and inorganic phosphates). The fetal whole blood and plasma were also found to contain more total nonprotein nitrogen than the maternal specimens. The urea and uric acid in the maternal and fetal blood were equal.

PLACENTA

Wehefritz¹⁶⁴ studied the proteins of the placenta in various stages of development and found that the protein molecules show distinct progressive changes with the increasing age of the placenta, which may be interpreted as being due to senility. The membranes of 50 labor cases were studied by Belosor¹⁶⁵ who found that hyalin change in the amnion is a physiologic process which makes it easy for the

amnion to tear during labor. In the cases where the amnion is born with the fetus, the hyalin change is only mild and accounts for the nonrupture of the membrane.

MISCELLANEOUS

The justification for the prenatal care of the pregnant woman is what it will do for both mother and child. Pólak¹⁶⁶ studied 3000 cases of pregnancy and labor and found that the less prenatal care the mothers received, the higher was the infant mortality. He outlines the chief points in prenatal care. According to Eichel¹⁶⁷ the prevention of death in childbirth depends upon (1) education of the public to the necessity for competent prenatal care and to the grave dangers of criminal abortion; (2) suppression of the criminal abortionist; (3) adequate hospital facilities for the poor and those of moderate means; (4) measures to make available expert obstetric advice for physicians in rural districts; (5) elevation of the standards of obstetric training and practice; (6) extreme aseptic precautions in the care of the patient, and (7) clinical, pathologic and statistic research to discover facts at present unknown and to discover the routes of puerperal infection.

Mosher¹⁶⁸ takes up the question of reducing the maternal death rate in Missouri and proposes the following: (1) to begin a campaign of education of the profession, a postgraduate drill in the diagnosis and management of pregnancy and labor; (2) to have a new curriculum of obstetrics which shall be more or less standardized; (3) to reach the secretaries of the state medical societies and through them the secretaries of the county medical societies to urge their members to stress the subject of obstetrics at their meetings. Morris,¹⁶⁹ who writes about conditions in Australia, agrees essentially with the above authors. Flint¹⁷⁰ is of the opinion that the most important factor which will produce improvement in maternity statistics is the better education of the undergraduate student. If the practice of obstetrics were invested with greater dignity and were better paid, more able men would be attracted to this branch of medicine. Flint believes that infection occurs most frequently in private practice and in general hospitals and least frequently in a special maternity hospital. Less operating and more conservatism is the outstanding remedy for the present high mortality.

It is emphasized by Rowland¹⁷¹ that obstetrics occupies at least 30 per cent of the time of the general practitioner and yet only 4 per cent of the total number of hours in the medical school curriculum are allotted to its teaching. To devote less than 15 per cent of the time of the last two years to obstetrics is a monumental mistake.

A number of reports have appeared in which the results of obstetric practice are analyzed. Stone and Sisson¹⁷² review the work done at the Johns Hopkins Hospital and also outline a very useful schema for the ready indexing of obstetric records. Hibben¹⁷³ surveys the results of the city of Pasadena, California. Kennedy, Streat, and Harries¹⁷⁴ give the results at the Chicago Lying-In Hospital during the years 1918-1925, while Fitzgibbon, Corbet and Falkiner¹⁷⁵ analyze the results at the Rotunda Lying-In Hospital. Tottenham¹⁷⁶ in his report, reviews the maternal mortality in a number of American hospitals.

REFERENCES

- (86) Surg., Gynec. and Obst., 1925, xl, 281. (87) AM. JOUR. OBST. AND GYNEC., 1925, x, 61. (88) Surg., Gynec. and Obst., 1925, xl, 868. (89) Am. Jour. Med. Sc., 1925, clxx, 256. (90) Jour. Lab. and Clin. Med., 1925, x, 641. (91) AM. JOUR. OBST. AND GYNEC., 1925, x, 761. (92) AM. JOUR. OBST. AND GYNEC., 1925, x, 763. (93) Jour. Am. Med. Assn., 1925, lxxxv, 332. (94) Jour. Am. Med. Assn., 1925, lxxxv, 1482. (95) Jour. Am. Med. Assn., 1925, lxxxv, 2049. (96) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxxi, 1. (97) AM. JOUR. OBST. AND GYNEC., 1925, x, 693. (98) AM. JOUR. OBST. AND GYNEC., 1925, ix, 835. (99) Jour. Am. Med. Assn., 1926, lxxxvi, 265. (100) AM. JOUR. OBST. AND GYNEC., 1925, x, 808. (101) Bull. Johns Hopkins Hosp., 1924, xxxv, 46. (102) Bull. Soc. d'obst. et de gynéc. de Par., 1925, xiv, 739. (103) AM. JOUR. OBST. AND GYNEC., 1925, ix, 35. (104) AM. JOUR. OBST. AND GYNEC., 1925, x, 83. (105) AM. JOUR. OBST. AND GYNEC., 1925, ix, 690. (106) Rev. franç. de gynéc. et d'obstét., 1925, xx, 265. (107) Jour. Am. Med. Assn., 1925, lxxxv, 1637. (108) Arch. f. Gynäk., 1925, cxxiv, 689. (109) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 182. (110) AM. JOUR. OBST. AND GYNEC., 1925, x, 35. (111) Surg., Gynec. and Obst., 1925, xl, 697. (112) AM. JOUR. OBST. AND GYNEC., 1924, vii, 349. (113) South. Med. Jour., 1925, xviii, 616. (114) AM. JOUR. OBST. AND GYNEC., 1925, ix, 342. (115) Texas State Med. Jour., 1925, xxi, 190. (116) Jour. Am. Med. Assn., 1925, lxxxiv, 791. (117) Surg., Gynec. and Obst., 1925, xl, 230. (118) Surg., Gynec. and Obst., 1925, xli, 502. (119) Bull. de la Soc. d'obst. et de gynéc. de Par., 1925, xiv, 572. (120) Bull. de la Soc. d'obst. et de gynéc., 1925, xiv, 574. (121) Internat. Clin., 1925, iv, 171. (122) AM. JOUR. OBST. AND GYNEC., 1925, x, 153. (123) Zentralbl. f. Gynäk., 1925, xlix, 1921. (124) Gynéc. et Obstét., 1925, xii, 185. (125) Gynéc. et Obstét., 1925, xii, 167. (126) Med. Klin., 1925, xxi, 698. (127) Jour. Am. Med. Assn., 1921, lxxvi, 566. (128) Arch. f. Gynäk., 1925, cxxv, 1. (129) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 327. (130) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 341. (131) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxix, 35. (132) AM. JOUR. OBST. AND GYNEC., 1925, x, 49. (133) Edinburgh Med. Jour., April, 1925, 69. (134) New Orleans Med. and Surg. Jour., 1925, lxxvii, 370. (135) Surg., Gynec. and Obst., 1923, xxxvi, 227. (136) Arch. f. Gynäk., 1925, cxxiii, 646. (137) Bull. de la Soc. d'obst. et de gynéc., 1925, xiv, 457. (138) Jour. Obst. and Gynec., Brit. Emp., 1925, xxxii, 259. (139) Meeting of Chicago Gynecological Society, February 19, 1926. (140) Boston Med. and Surg. Jour., 1925, xcii, 1037. (141) Jour. Obst. and Gynec., Brit. Emp., 1925, xxxii, 318. (142) Surg., Gynec. and Obst., 1925, xl, 296. (143) Bull. de la Soc. d'obst. et de gynéc., 1925, xiv, 698. (144) AM. JOUR. OBST. AND GYNEC., 1925, ix, 17. (145) AM. JOUR. OBST. AND GYNEC., 1925, x, 521. (146) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxx, 257. (147) Zentralbl. f. Gynäk., 1924, xlviii, 1139 and München med. Wehnschr., 1924, lxxi, 576. (148) Deutsch. med. Wehnschr., 1925, li, 469. (149) Monatschr. f. Geburtsh. u. Gynäk., 1925, lxviii, 273. (150) Jour. Am. Med. Assn., 1925, lxxxv, 116. (151) AM. JOUR. OBST. AND GYNEC., 1925, ix, 228. (152) Am. Jour. Med. Sc., 1925, clxix, 419. (153) Jour. Am. Med. Assn., 1925, lxxxv, 336. (154) AM. JOUR. OBST. AND GYNEC., 1925, ix, 452. (155) AM. JOUR. OBST. AND GYNEC., 1925, x, 601. (156) Deutsch. med. Wehnschr., 1925, li, 1725. (157) München. med. Wehnschr., 1922, lxix, 1110 and 1431. (158) Zentralbl. f. Gynäk., 1925, xlviii, 2581. (159) Minn. Med., 1925, viii, 586. (160) AM. JOUR. OBST. AND GYNEC., 1925, ix, 151. (161) Zentralbl. f. Gynäk., 1925, xlix, 1796. (162) Zentralbl. f. Gynäk., 1925, xlix, 2703. (163) Bull. Johns Hopkins Hosp., 1925, xxxvi, 393. (164) Arch. f. Gynäk., 1925, cxxiv, 511. (165) Zentralbl. f. Gynäk., 1925, xlix, 644. (166) New York State Jour. Med., 1925, xxv, 735. (167) New York State Jour. Med., 1925, xxv, 55. (168) Jour. Missouri State Med. Assn., 1925, xxii, 133. (169) Med. Jour. Australia, 1925, ii, 301. (170) AM. JOUR. OBST. AND GYNEC., 1925, ix, 864. (171) Jour. Am. Med. Assn., 1925, lxxxiv, 1297. (172) AM. JOUR. OBST. AND GYNEC., 1925, x, 718. (173) AM. JOUR. OBST. AND GYNEC., 1925, x, 843. (174) Published by The Chicago Lying-In Hospital, 1925. (175) Irish Jour. Med. Sc., August, 1925, p. 337. (176) Irish Jour. Med. Sc., November, 1925, p. 516.

Correspondence

To the Editor:

The following account of a visit to Prof. Stroganoff in Leningrad and to Moscow in September, 1925, may be of interest to the readers of the Journal. The purpose was twofold: to visit Prof. Stroganoff's clinic in Leningrad, and to learn something of the Soviet's program for maternal and infant care. To the clear statement of these purposes and to the efforts of Prof. Stroganoff we owed our visé, the procuring of which, however, was a most difficult task, for permission to enter Russia is granted only for very definite reasons. This letter is not a discussion of politics, nor of the so-called dangers of travel in the U. S. S. R. Everywhere we received most courteous treatment. We should like to go again.

We spent four days in Leningrad. Prof. Stroganoff gave us the greater part of two working days. He is in charge of the Obstetric Division of the State (formerly the Imperial) Institute for Obstetrics and Gynecology. It is situated across the Neva, in the Vasily Ostrov district of the city, opposite the University, and but a short distance from the former Winter Palace. It is in its own grounds with a high iron fence, and it seemed a haven of rest from the city outside. Everyone upon entering must lay aside wraps and coats, and put on a long clean white gown. It is an excellent building, erected ten years ago at a cost of \$2,500,000, with wide corridors, tiled floors throughout, and an abundance of light and air. It is scrupulously clean and modern in every way. At the head of the wide marble stairway facing the entrance is the statue of Dr. Ott, who has been the moving spirit of the institution. The hospital has apparently suffered little deterioration (though some is evident), is well staffed and managed, and * * * * planned on a most elaborate scale. It is a postgraduate institution for doctors and has a school for midwives. Dr. Stroganoff has about 150 beds on his service. According to the rules, every doctor doing work in obstetrics here takes a bath before entering the department. There are two delivery units, used on alternate days. Delivery takes place on the beds in the labor-delivery rooms, and normal cases are cared for by the midwives. Private rooms are about \$1.00 per day. Dr. Stroganoff lives in the hospital grounds; his wife, also a physician, works in the same institution. He invited us to his apartments and we were most interested to study the man himself. He is a gentleman of the old school, apparently between sixty and seventy years of age. It has been more difficult for him to adjust himself to changed conditions than for the younger men of his staff. All, without exception, expressed admiration for the Soviet program for maternal and infant care, and said that we could find out all about it in Leningrad, without going to Moscow.

He was proud that a doctor should come so far to see him and his world-famed work, for few indeed come these days, and (as a matter of fact) few Americans ever made the long journey in the old days. He was most happy and enthusiastic and keenly interested in America. * * * * Incidentally, he was much amused by the inquiry from this country as well as from England, whether he was still alive. He speaks a little German and English. * * * * One of his assistants stated that his salary from the State was about \$100 a month, and that he received some extra from private work, though very little.

Naturally we were most interested in his treatment of eclampsia and his results. We had the rare opportunity of seeing him treat a case. He elaborated his treat-

ment in 1897, and published his method in a Russian journal in 1899. As far as I have searched in American literature, nowhere have I found his complete technic, note, I say *complete*. His fundamental idea is, *stop the fits*. The greater the number of fits, the higher the mortality. Formerly, he considered eclampsia a contagious disease; his present theory is that it is of placental origin, the syncytial cells producing antibodies or themselves breaking down into toxins. The sequence of events is: the toxins (whatever their origin) irritate the nervous system, particularly the vasomotor, which is especially susceptible during pregnancy; the result is blood vessel spasm with increased blood pressure, headache, eye symptoms, epigastric pain, convulsions, with loss of consciousness. The quality and quantity of the toxins and the degree of irritability of the nervous system determine the severity of the reaction. In the vast majority of cases eclampsia is a self-limited disease. His treatment tries to: (1) lessen the toxins in the blood by the administration of fluid, by the production of perspiration, and by venesection; (2) lessen the irritability of the nervous system by the prevention of irritation, and by the use of narcotics, morphine, chloral hydrate and chloroform (all used more or less haphazardly for fifty years). These reduce vessel spasm, convulsions and headache; lessen pain; dilate vessels; (3) maintain body functions.

He has treated 900 cases of eclampsia, the last 300 by his "improved method." In these last 300 cases he has had eight deaths, a maternal mortality of 2.6 per cent, and of these four were moribund on admission. Among these 300 cases his fetal mortality was 16 per cent. During the last year he has had 50 cases with two deaths, one moribund on admission and one dying of hemorrhage into the fourth ventricle. He has treated 25 cases by consultation over the telephone, and hopes to treat a case by radio! He expressed regret that his method (not some "modified Stroganoff," for, he asks, what valid reason has one to modify it?) had not been thoroughly and strictly carried out in this country, for he feels that our mortality could be lowered materially. He is very insistent that to get proper results with his treatment the technic must be adhered to very rigidly. Our visit with him and to his clinic was very well worth while.

Armed with a letter to the "Narkomsdraw" and a personal note to Mme. Kamanev we traveled to Moscow to learn something of the Soviet program for maternal and infant care. Soviet Russia proper, including most of Asiatic Russia, but not White Russia and the Ukraine, has a population of 96,500,000, nearly 90 per cent rural, with a density of 4.8 per square kilometer. There is an illiteracy of probably over 80 per cent, and a peasant class, poor, ignorant, superstitious, hostile and suspicious, serfs till sixty odd years ago. Among the mass of the people pregnancy, childbearing, and childrearing have little changed since Peter's time or before. The problems of maternal and infant care, under such conditions (particularly rural), are very great. The task is staggering. The department having it in charge realizes the situation very clearly and has apparently worked at the problem along three lines, the last two representing definite changes of policy. First was the establishment of dispensaries (consultations) and nurseries. The mothers must be instructed, the milk guarded, and an intensive propaganda for infant care started. From 1917 to 1924 nurseries increased from 14 to 510; children's dispensaries from 6 to 262; dispensaries for pregnant women from none to 159; village dispensaries from none to 117. In 1925, one hundred and twenty-five new dispensaries (consultations) were established in cities and towns, 120 in rural districts; 137 new nurseries were also established. Special emphasis is placed upon summer nurseries in the villages for the mothers working in the fields. Their number increased from 125 in 1922 to 524 in 1924. In the province of Samara during two months in the summer of 1925, two thousand children passed through such nurseries. The goal is to make the consulta-

tions the center of "healing, prevention and education"—by word of mouth, literature, leaflets, pamphlets, etc. In 1924, one million three hundred and fifty thousand propaganda cards for maternal and infant care and 80,000 colored posters were distributed. Nowhere in the world is there anything like them.

The second line of endeavor has been the shifting of the emphasis of service to the masses, from the city to the country. This began in 1922. Facilities for childbirth and childcare are very primitive in the rural districts. Instead of one obstetric bed for each 1,500 of population (which they figure is the proper ratio), there is only one for each 4,500. Village dispensaries are without physicians, scales or exhibits. There are not enough doctors and trained midwives. Funds have not been available, and penetration into the villages and the country has been extremely slow.

Thirdly and most recently the attempt has been made to enlist the help and interest of the local workers' organizations and the communities themselves, especially the cooperative societies and the mutual aid committees, asking for financial aid and for space in the cooperative stores for articles for mother and child. The large industrial companies have done some very good work for mothers and their babies, among their workers and in their communities.

It is frankly admitted that, strictly speaking, little has been accomplished. They say, "At least we are trying to do something. What can be accomplished at such a task in eight years (really about half that)? Give us time and a chance."

The Department of Maternal and Infant Welfare maintains the following types of institutions: maternity hospitals and wards, homes for mother and child, homes for children under one year, homes for children one to three years, consultations for pregnant women, consultations for babies, day nurseries (including summer nurseries) and legal consultations.

Our contact with this phase of public health work (maternal and infant welfare) was made through a Dr. Mark Scheftel, graduate of the University of Karkov, student of law three years at the Sorbonne in Paris, student of medicine five years in Rome, speaking Russian, German, French, and Italian. He had spent some time in prison before the Revolution because of his political views, is an ardent communist and is happy to work and receive \$96 a month. We met the People's Commissar of Health, Dr. N. A. Semashko, and his assistant, Dr. Solovief. This Commissariat of Health (known as the "Narkomsdraw") has at least seventeen departments. The Dr. Scheftel mentioned is chief of the department dealing with public health relations with other countries. There is a Russian Public Health Service and representatives in France, England, Germany, Italy, Switzerland, Austria, and the United States. The Department of Maternal and Infant Welfare is in charge of Dr. Lebedeva, a woman physician. She was not in Moscow when we were there. We visited a home for mothers and babies, a communistic idea, free for two months before and two months after birth with one week in a maternity hospital or ward for delivery. Many cases of illegitimacy are in such homes. Two months postpartum the mother may go out and work and thus contribute to the support of herself and child; the care is otherwise, of course, free. In the dispensaries for consultations for pregnant women effort is made to register the mothers in the fifth month, and they are given a course of six lectures.

The most interesting institution that we visited in Moscow was the Central Institute for Mother and Infant Welfare. This was formerly the Foundling Hospital, founded by Empress Catherine in 1763 and maintained through the succeeding monarchies by the sale of playing cards, which was made a government monopoly. It is an enormous place, formerly accommodating 2,500 infants. Its gardens and grounds appear rather shabby. It has been made into an institution for the graduate instruction of physicians in obstetrics and pediatrics, and a school for midwives and for

nurses, each of these two latter courses lasting two and a half years. The attendance when we were there was about 150 doctors, and about 250 midwives and nurses each. There are 100 obstetric beds, 50 cribs in the day nursery, and places for 450 well and sick (no infections) babies which are admitted only if suitable for scientific or teaching purposes. We were conducted about by the assistant director, a Dr. Baron, graduate of the famous university at Dorpat in Esthonia (at that time a part of Russia). The buildings are mostly old (we saw very little new building in Russia), but spotlessly clean, in perfect order and well managed. There is a scientifically organized milk kitchen, a rather small laboratory, and a moderate sized library (rather in confusion) with many foreign journals. They have their own journal, *Zur Erlehrung der Psychologie, Pathologie und Physiologie des Kindes*. Here also was a most complete exhibit of the history of breast feeding, beginning with Romulus and Remus; also a large display of posters and a number of life-sized wax figures. Here doctors, nurses and midwives are trained in maternal and infant welfare for Soviet Russia. But they are trained in other things than science. Let me quote from a report of the department: "Welfare courses for physicians, midwives and nurses in general social practice, for political education of backward women, explaining how the Soviet regime improves the status of the working woman, so that they become accustomed to giving talks, addressing meetings, managing excursions, working with delegates." Here in 1924 were thus trained 97 physicians, 67 midwives and 45 social workers.

In closing I want to make one thing very clear. Whatever I have said about this work of Soviet Russia, do not for a single moment conclude that I harbor any delusions about the Bolshevik government and its rather wearisome political propaganda. It is a most powerful political machine, that now exercises a despotism as relentless and widespread as ever existed under the czars. But, whatever may be the methods of the Soviets, however much we may imagine that they menace the peace, order and safety of the civilized world, and however great may be the mockery of their communistic freedom, nevertheless they are trying to do something for the common woman of Russia and her child, for whom little enough has been done for two hundred years. Doubtless much is on paper only; much is just hope and dream. Possibly they showed us only what they wanted us to see, but that of its kind was good and clean and directed by educated and interested men whom I deem it a privilege to have met. They are deadly in earnest about it all. Some day, I believe, great things are going to come out of Russia.

S. B. BLAKELY, M.D.

BINGHAMTON, N. Y.

February 25, 1926.

Erratum

Issue of March, 1926, p. 420. In the discussion by Dr. P. B. Salatich, at a meeting of the New Orleans Obstetrical and Gynecological Society, on the delivery of the fetus in an abdominal pregnancy by colpotomy, the following sentence was inadvertently omitted:—"I need not remind you that this was many years ago." Correction of the error is herewith made, as Dr. Salatich is naturally averse to appearing as an advocate of such procedure.

INDEX TO VOLUME XI

AUTHORS INDEX

A

- AUBERTIN, C. Pernicious anemia of pregnancy, (Abst.), 728
 AVILES, M., (WITH MÖNCKEBERG, C.). The histopathology of syphilitic placentae and its clinical importance, (Abst.), 280

B

- BABES, A., (WITH DANIEL, C.). A study of xanthoma of the uterine tube, (Abst.), 141
 BALDWIN, J. F. Hysterectomy in certain cases of pulmonary tuberculosis; particularly as an alternative for therapeutic abortion, (Abst.), 724
 BARNEY, W. R. Report of a case of separation of the dorsal vertebrae in podalic version and extraction, 116
 BATHE. The Sachs-Georgi flocculation reaction in pregnancy, (Abst.), 278
 BAUMANN. Death from scopolamine, (Abst.), 437
 BEAKE, M., (WITH RIECHART, P.). The study of the effect of ether analgesia on the isoagglutinins of human blood, 568
 BECERRO DE BENGUA, R. Gynecologic surgery of cysts included in the ilio pelvic mesentery, (Abst.), 142
 BELDING, D. L. Notes on the etiology and epidemiology of impetigo contagiosa neonatorum, 70
 BELL, J. W. Supernumerary breast near labium, 507
 BERARD, L., AND DUNET, C. Cysts of the Bartholin gland, (Abst.), 135
 BERKOFF, (WITH BYRON, C. S.). The incidence and end-results of carcinoma of the ovary at the Woman's Hospital, 559
 BERREY, IVAN C., (WITH PACK, GEORGE T.). Janiceps asymmetros, with the report of a case, 779
 BLAND, P. B. Infant, injuries of the, during delivery, 477, 529
 BLAND-SUTTON, J. The habits (ecology) of tumors, (Abst.), 136
 BOIJE, O. A. Conservative myoma operations during pregnancy, (Abst.), 734
 BOREEL. A case of icterus gravidarum, (Abst.), 730
 BOWING, H. H. Surgery, radium and roentgen rays in the treatment of carcinoma of the cervix, 400

- BROWN, J. H., (WITH HARRIS, J. W.). A method of obtaining vaginal secretion for bacteriologic examination without the possibility of vulval contamination, 497
 BROWNE. On the influence of pregnancy on the Wassermann reaction and on the clinical manifestations of syphilis, (Abst.), 278
 BULLARD, E. A. A study of end-results of operations for uterine prolapse at the Woman's Hospital, 1915-1925, 623, 688
 BYRON, C. S., AND BERKOFF, H. A. The incidence and end-results of carcinoma of the ovary at the Woman's Hospital, 559

C

- CAPPER, A. The relation of the endocrine system to pregnancy, (Collective Review), 269
 CARTER, PHILIPS J. The vomiting of pregnancy, its causation and its treatment by ovarian extract, 823, 866
 CASWELL, C. E. Pregnancy in the remaining horn of a uterus didelphys after torsion and partial hysterectomy, 853
 CHARLTON, H. R. Congenital hernia at the linea alba, 103, 120
 CHERRY, T. H. The relation of blood sedimentation to pelvic disorders, 105
 CHRISTOPHER, F. Large fibromyoma of cervix, 668
 CLARK, E. D. Report of a case of mesenteric cyst, 238, 267
 CLEISZ, L. Therapeutic indications in pulmonary tuberculosis associated with pregnancy, (Abst.), 721
 CLEMENT, (WITH DUJOL). Obstetrical anesthesia produced by somnifene, (Abst.), 436
 COLLIN, R., (WITH FRUINSHOLZ, A.). A case of acute tuberculosis (meningitic and hypophyseal) at the beginning of gestation, (Abst.), 726
 CORSCADEN, JAMES A. The radiotherapeutic menopause: its significance and management, 803, 856
 COTTE AND CRYSEL. Myomectomy during pregnancy, (Abst.), 734
 COUVELAIRE, M. A. The future of children born of women with pulmonary tuberculosis, (Abst.), 723

- CRON, R. S. Chancre of the cervix, with report of two cases, 378
- CROOK. The incidence of glycosuria during pregnancy, (Abst.), 727
- CRYSSEL, (WITH COTTE). Myomectomy during pregnancy, (Abst.), 734

D

- DANFORTH, W. C. Obstetric anesthesia and analgesia, (Abst.), 434
- DANIEL, C., AND BABES, A. A study of xanthoma of the uterine tube (salpingitis xanthomatosa), (Abst.), 141
- DANNREUTHER, W. T. Extrameatal prolapse of the urethra with the report of a case having an acute onset, 468, 522
- DARNER, H. L. Torsion of the normal fallopian tube, 368
- DAVIES, J. C. Labor complicated by malignant growth, (Abst.), 733
- DAVIS, A. B. President's address: American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Thirty-eighth annual meeting, 147
- DAVIS, IRENE, (WITH HERZSTEIN, J.). The treatment of incomplete abortion, 577
- DAX, (WITH DUVERGY). Pyelonephritis in pregnancy, (Abst.), 730
- DEBRE, R. Prevention of tuberculosis in the newborn, (Abst.), 723
- DEDoux, L. A. Full-term extrauterine pregnancy, with report of three cases, 395, 420
- DELMAS, P., AND ROUME, A. Obstetrical anesthesia by means of the ureic compounds, (Abst.), 436
- DICKINSON, R. L. Sterility-fertility studies in animals and their bearing on human problems, 51
- DIETRICH. Collective statistics on the treatment of febrile abortion, (Abst.), 553
- DODD, W. E. Sarcoma of the fallopian tube, (Abst.), 138
- DORSETT, L. The intramuscular injection of magnesium sulphate for the control of convulsions in eclampsia, 227, 262
- DOWNING, W. L. Intraperitoneal hemorrhage complicating abortion, 503
- DRAPER, J. W., AND STUDDIFORD, W. E. Report of a case of actinomycosis of the tubes and ovaries, 603, 701
- DUJOL AND CLEMENT. Obstetrical anesthesia produced by somnifene, (Abst.), 436
- DUNCAN, E. E., (WITH STANDER, H. J., AND SISSON, W. E.). Heart output during pregnancy, 44
- DUNHAM, BERMAN S. Cistern puncture in intracranial birth injuries, 833

- DURYEA, G. D., (WITH SOUTER, M. C.). Posttransfusion reactions. A review of 190 transfusions performed at the Woman's Hospital, New York City, 569
- DÜTZMANN, M. Simultaneous abortion and sterilization, (Abst.), 724
- DUVERGY AND DAX. Pyelonephritis in pregnancy, (Abst.), 730

E

- EASTMAN, N. J. Spontaneous rupture of the uterus in labor following Sturmdorf tracheloplasty, 500
- ELLIOT, W. P., (WITH WITTER, M. S.). Postoperative leucocytosis, 555
- EMERY, C. W. A. Early pregnancy and epitheliomas, (Abst.), 733
- ERDMANN, J. F. Diverticulitis of the colon, 609, 682
- EYMER, H. The value of the life of the unborn in obstetrics, (Abst.), 547

F

- FARRAR, (WITH WARD, GEO. G.). The radium treatment of carcinoma uteri, 439
- FAUGHT, F. A. Blood pressure and urinary findings in 100 cases of normal pregnancies, 633, 693
- FAVREAU, M., AND QUERRIOUX, F. Gestation and nephrectomy for renal tuberculosis, (Abst.), 725
- FEUILLADE, (WITH FRÜHINSHOLZ). Genital tuberculosis and pregnancy, (Abst.), 725
- FINDLEY, P. Precancerous lesions of the uterus, 450, 519
- FISCHL. Profeta's immunity, (Abst.), 283
- FISHER, A. O., (WITH ROYSTON, G. D.). Appendicitis in pregnancy, 184, 247
- FOWLER, W. A. The relation of the physiology and mechanics to the management of labor, 212, 256
- FRANK, R. T. New books, (Collective Review), 122
- FRANKE. Labor under hypnosis for the clinical physician, (Abst.), 435
- FRANQUE VON, O. Basic principles in the technic of cleaning out abortions, (Abst.), 550
- FREY. Prognosis of heart disease in pregnancy, (Abst.), 721
- FROMMER, E. M. The differential diagnosis of ectopic pregnancy, (Collective Review), 423
- FRÜHINSHOLZ, A., AND COLLIN, R. A case of acute tuberculosis (meningitis and hypophyseal) at the beginning of gestation, (Abst.), 726
- FRÜHINSHOLZ AND FEUILLADE. Genital tuberculosis and pregnancy, (Abst.), 725

G

- GEMMEL. Menstruation and pregnancy in Hodgkin's disease, (Abst.), 728
- GLADDEN, A. H., JR. The conduct of labor after cesarean section, 642, 698
- GOETHALS, T. R., (WITH IRVING, F. C.). Elimination of the second stage of labor in breech presentations, 80
- GORDON. Management of abortion, (Abst.), 552
- GOTTING, F. A contribution to the management of abortions, (Abst.), 551
- GRABICH, F. Active or conservative treatment of septic abortion, (Abst.), 553
- GRACCO, F. H., (WITH MALONEY, W. M.). Pyelitis as a postoperative complication, 579
- GREENHILL, J. P. The obstetric literature of 1925, 708, 869

H

- HALSTED AND WILENS. The need for a urologic department in every gynecologic clinic, 702
- HANNAH, C. R. The prevention of stillbirths, 231, 263
- HARDING, V. J., AND VAN WYCK, H. B. The use of fluids in the treatment of hyperemesis gravidarum, 1
- HARRAR. Rectal ether analgesia in childbirth, (Abst.), 438
- HARRIS, H. A. Phocomelus with congenital cystic elephantiasis, 767
- HARRIS, J. W., AND BROWN, J. H. A method of obtaining vaginal secretion for bacteriologic examination without the possibility of vulval contamination, 497
- HEANEY, N. S. Ethylene in obstetrics, (Abst.), 437
- HEBERT, J. S. A critical analysis of 250 prenatal charts, 387
- HEIM. Two cases of physometra, (Abst.), 554
- HELLENDALL. Supravaginal amputation of the uterus in severe post-abortive bleeding, (Abst.), 554
- HENRARD, E. Quinine therapy in febrile abortions, (Abst.), 554
- HERRICK. Heart disease in relation to marriage and pregnancy, (Abst.), 720
- HERTZLER, A. E. An inquiry into the nature of chronic appendicitis, 155, 247
- HERZSTEIN, J., AND DAVIS, IRENE. The treatment of incomplete abortion, 577
- HEWITT. Bacterial infection of the urinary tract complicating pregnancy and the puerperium, (Abst.), 731

- HEYN. Perforations of the uterus and their treatment, (Abst.), 551
- HOCHMAN, S. S. The incidence of carcinoma in the cervix following supravaginal hysterectomy, 566
- HOLDEN, F. C. Inversion of the uterus, 412
- HOST. Carbohydrate tolerance in pregnancy, (Abst.), 726

I

- IRVING, F. C., AND GOETHALS, T. R. Elimination of the second stage of labor in breech presentations, 80

J

- JOHNSTONE. Adenomyoma of the uterus with tuberculous infection, (Abst.), 138

K

- KALMAN, (WITH KLAFTAN). Studies on syphilis and pregnancy, (Abst.), 282
- KANE, H. F. A delivery room mirror, 533
- KARLIN, M. The retention of dead fetuses in the uterine cavity, (Abst.), 548
- KEHRER. Proposal for a standard of operative technic in abortions and premature labors, (Abst.), 549
- KELLOGG, F. S. Treatment of placenta previa based on a study of 303 consecutive cases at the Boston Lying-In Hospital, 194
- KERWIN, W. Weight estimates during pregnancy and the puerperium, 473
- KING, E. L. A case of pernicious vomiting of pregnancy cured by the use of the duodenal tube, in which death ensued from myocarditis, 418
- KLAFTAN AND KALMAN. Studies on syphilis and pregnancy, (Abst.), 282
- KO CHI SUN, (WITH WILLIAMS, J. WHITRIDGE). A statistical study of the incidence and treatment of labor complicated by contracted pelvis in the obstetric service of the Johns Hopkins Hospital from 1896 to 1924, 735, 861
- KOSTER. Analgesia in labor by means of hypnosia, (Abst.), 434
- KOVACS, F. Thyroid tumor of the ovary, (Abst.), 141
- KRIGBAUM, R. E. On a possible cause for pemphigus neonatorum, 494
- KROSS, I. An investigation into the causation of the onset of labor by parabiosis during pregnancy, 64

L

- LACKNER, (WITH SCHOCHET, S. S.). A review of the gynecologic literature of 1925, (Collective Review), 534
- LANKFORD, B. Preparation of the external genitalia for delivery with iodine-alcohol. Report of 100 cases so treated with bacteriologic results, 219, 256
- LARRABEE. The severe anemias of pregnancy and the puerperium, (Abst.), 729
- LEVY, W. E. Hemorrhage, followed by shock and acidosis, with immediate recovery after the administration of glucose and insulin, 864
- , (WITH NEWMAN, J. W.). The mechanics of birth injuries, their cause and prevention, 645
- LEVY-DU PAN. A case of hypernephroma of the ovary, (Abst.), 140
- LEVY-SOLAL. Syphilis of the ovum and fetus, (Abst.), 282
- LIEBERMAN, BARNARD L. An analysis of seventy-nine cases of placenta previa, 814
- LIEBLING, PHILIP. Purpura hemorrhagica complicating pregnancy, 847
- LIN, MARGARET H. D. Twilight sleep in China, (Abst.), 437
- LINDEN, H., (WITH VON OETTINGEN, K.). Heterotopic epithelial proliferation of uterine mucosa in the ovary and their relationship to chocolate cysts, (Abst.), 140

M

- MACFARLANE, C. Infection of the abdominal incision, incidence in five hundred gynecologic laparotomies, 630, 692
- MALONEY, W. M., AND GRACCO, F. H. Pyelitis as a postoperative complication, 579
- MANLEY, J. R. Report of a case of true ovarian pregnancy, 512
- MANNA, A. Clinical study of a new analgesis in obstetric and gynecologic practice, (Abst.), 436
- MAYER, G. A. Cystadenoma of the ovary, with report of cases, 383, 421
- MCCORD, JAMES R. Syphilis of the placenta in the Negro, 850
- MCCORMICK, C. O. Outlet pelvimetry and its importance, 794
- MILLER, ADAM M., (WITH PERKINS, ORMAN C.). Sebaceous glands in the human nipple, 789
- MILLER, C. JEFF. Glucose and insulin in the toxemias of pregnancy, 763, 865

- MILLER, H. E. Macerated premature twins with six true knots of the cord, 695
- MILLS, R. G., AND WALPERT, B. E. Report of a case of ectopia viscerum, rachischisis, malformation of the sacrum, pelvis inversa hypoplasia of the thoracic duct, agenesis or hypoplasia of various abdominal viscera and placenta previa, 19
- MOENCH, G. L. Cervicitis, erosion and laceration of the cervix uteri from the standpoint of pathology, 453
- , The passive hyperemia treatment of chronic cervicitis, 637
- MÖNCKEBERG, C., AND AVILES, M. The histopathology of syphilitic placentae and its clinical importance, (Abst.), 280
- MORRIS, R. T. Five kinds of chronic appendicitis, 180, 247
- MOSHER, G. C. The incompatibility of pregnancy and fibroids in the uterus, 404
- MUSSEY, R. D. Observations on the treatment of the edema of the toxemia of pregnancy with ammonium chloride, 222, 262

N

- NATHANSON. Syphilis in relation to pregnancy, (Abst.), 283
- NEUMANN, W. Clinical experiences in tuberculosis complicating pregnancy, (Abst.) 722
- NEWMAN, J. W., AND LEVY, W. E. The mechanics of birth injuries, their cause and prevention, 645, 696

O

- OASTLER, F. A. Complete inversion of the uterus, 410
- ODERMATT, W. Carcinoma and pregnancy with especial reference to mammary carcinoma, (Abst.), 733
- OGASAWARA, K. Experimental studies of intrauterine death of fetus, (Abst.), 548
- OHLSSON, I. A case of leucemia of pregnancy, (Abst.), 729
- OUTLAND, J. H. Right rotation of the appendix from congenital bands as a factor in the etiology of appendicitis, 247

P

- PACK, GEORGE T., AND BERREY, IVAN C. Janiceps asymmetros, with the report of a case, 779
- PANKOW, O. What is the correct therapy in the treatment of pregnancy complicated by pulmonary tuberculosis? (Abst.), 722

- PARDEE. Pregnancy complicating heart disease, (Abst.), 720
- PAULIUCU-BURLA. On the pathology of vaginal cysts, (Abst.), 135
- PECKHAM, C. H., (WITH STANDER, H. J.). A classification of the toxemias of the latter half of pregnancy, 583
- PEIGHTAL, T. C. Postoperative parotitis with a report of a case, 88, 118
- PELKONEN. On the treatment of febrile abortions, (Abst.), 553
- PETERSEN. Mixed tumors of the uterus, (Abst.), 138
- PERKINS, ORMAN C., AND MILLER, ADAM M. Sebaceous glands in the human nipple, 789
- PFAFF, O. G. Ligation of inferior vena cava, 682
- PHANEUF, L. E. Inversion of the uterus, 171, 252
- PIPER, E. B. A special instrument for use on the aftercoming head, 523
- PORTIS, B. Syphilis of the uterus and adnexa, (Abst.), 284

Q

- QUERRIOUX, F., (WITH FAYREAU, M.). Gestation and nephrectomy for renal tuberculosis, (Abst.), 725

R

- RATHERY. Diabetes and pregnancy, (Abst.), 727
- RAWLS, R. M. Lipoma of the broad ligament, 410
- ROBINSON. Heart disease in pregnancy, (Abst.), 718
- RONGY, A. J. Oviduct insufflation, based on a study of 400 cases, 616, 685
- REICHART, P., AND BEAKE, M. The study of the effect of ether anesthesia on the isoagglutinins of human blood, 568
- RIES, E. The danger of malformation of fetus in roentgen-ray treatment during pregnancy, 361
- RISS. Obstetrical analgesia produced by somnifene, (Abst.), 435
- ROBERTS, C. S. L. The relation of syphilis to obstetrics, (Abst.), 281
- ROSENHOHN, M. Obstetric mortality. An analysis of the cases at the Lying-In Hospital in 1924, 96, 121
- ROUME, A., (WITH DELMAS, P.). Obstetrical anesthesia by means of the ureic compounds, (Abst.), 436
- ROYSTON, G. D., AND FISHER, A. O. Appendicitis in pregnancy, 184, 247
- RUCKER, M. P. Prolapse of the placenta, 189, 252
- RUMPF. Pernicious-like anemia of pregnancy, (Abst.), 728

S

- SALATICH, P. B. Acute appendicitis incarcerated in a right inguinal hernia, 417
- SCHMID, H. H. Retroperitoneal and mesenteric tumors, (Abst.), 142
- SCHMIDT, H. R. The significance of heart failure in pregnancy, (Abst.), 719
- SCHMITZ, A. M., AND SCHMITZ, H. The sedimentation test in pelvic diseases of the female, 353, 409
- SCHOCHET, S. S., AND LACKNER, J. E. A review of the gynecologic literature of 1925, (Collective Review), 534
- SCHWEITZER. Complication of pregnancy with carcinoma, (Abst.), 732
- SEELIG, M. G. Endometrial adenoma (implantation) in the vermiform appendix, 461
- SIEGERT, F. Results of supravaginal amputation and castration in tuberculous women, (Abst.), 724
- SIMS, H. V. Malignant degeneration of uterine leiomyomata, 697
- SISSON, W. E., (WITH STANDER, H. J., AND DUNCAN, E. E.). Heart output during pregnancy, 44
- SLOAN, E. P. Duodenal ulcer from partial obstruction at the duodeno-jejunal junction, 492, 523
- SMITH, W. S. Obstetrical heresies at the Brooklyn Hospital, 414
- SOUTER, M. C., AND DURYEA, G. D. Posttransfusion reactions. A review of 190 transfusions performed at the Woman's Hospital, New York City, 569
- SPENCER. Suppurating teratomatous cyst in the splenic region, (Abst.), 142
- STALLWORTH, W. L. Full-term intra-ligamentous pregnancy, 863
- STANDER, H. J., AND PECKHAM, C. H. A classification of the toxemias of the latter half of pregnancy, 583
- , DUNCAN, E. E., AND SISSON, W. E. Heart output during pregnancy, 44
- STEINHARDT, B. Clinical and statistical study of sarcoma of the uterus. (Abst.), 137
- STEPHENS, W. E. Renal tuberculosis during pregnancy, (Abst.), 725
- STONE, E. L. Obstetric shock, 650
- STROGANOFF, B. The improved prophylactic method of treating eclampsia with comments on the variations suggested by Williams, Stander, Speidel, and King, 756
- STUBLER. Heterotopic epithelial growths in the genital organs, especially the ovary, (Abst.), 140

STUDDIFORD, W. E., (WITH DRAPER, J. W.). Report of a case of actinomycosis of the tubes and ovaries, 603, 701

T

TELFAIR, J. H. Osteogenesis imperfecta, 860

TEN BERGE. The treatment of abortion and puerperal sepsis, (Abst.), 554

THOMPSON, W. Syphilitic backache, (Abst.), 284

THOMS, HERBERT. A case of fetal dystocia, 839, 861

TOOMBS, P. W. The occiput posterior, 206, 256

TUTTLE, H. K. The treatment of abortions, (Abst.), 552

TVEDEGAARD, G. Fetal syphilis, (Abst.), 281

U

UMBACH, J. Intrauterine fetal degeneration, (Abst.), 549

V

VANDESIAL, R. Spinal anesthesia in obstetrics, (Abst.), 437

VAN DONGE. Threatened abortion, (Abst.), 548

VAN HASSELT. Analgesia in labor, (Abst.), 434

VAN SWERINGEN, B. Indications for cesarean section, 201, 256

VAN WYCK, H. B., (WITH HARDING, V. J.). The use of fluids in the treatment of hyperemesis gravidarum, 1

VAUTHIN. Tuberculosis of ovaries and pregnancy, (Abst.), 725

VIGNES. Cervical carcinoma and gestation, (Abst.), 731

—. Growth of cancer of the breast during pregnancy, (Abst.), 733

—. Syphilis during gestation and confinement (Abst.), 279

VILLARAMA, ANTONIO. The protection of the perineum, 823

VOGT, E. Theoretical and practical consideration arising from the study of endometrial-like epithelial growths in the ovary, (Abst.), 139

VON OETTINGEN, K., AND LINDEN, H. Heterotopic epithelial proliferation of uterine mucosa in the ovary and their relationship to chocolate cysts, (Abst.), 140

VOZZA, F. A case of pyelitis of pregnancy caused by *B. typhosus*, (Abst.), 731

VULOVIC, L. On the early diagnosis of congenital syphilis at birth through demonstration of spirochetes in the umbilical cord, (Abst.), 279

W

WAGNER, G. A. Cardiac deaths in pregnancy and labor, (Abst.), 719

WALPERT, B. E., (WITH MILLS, R. G.). Report of a case of ectopia viscerum, rachischisis, malformation of the sacrum, pelvis inversa, hypoplasia of the thoracic duct, agenesis or hypoplasia of various abdominal viscera and placenta previa, 19

WARD. Marriage, pregnancy, parturition and tuberculosis, (Abst.), 721

WARD, GEO. G. Radium treatment of cancer of the uterus, 690

— AND FARRAR, L. K. P. The radium treatment of carcinoma uteri, 439

WEISS, E. A. The treatment of fibroids of the uterus, 404

WELZ, WALTER E. Ablatio placentae, 842

—. The development of prenatal care in Detroit, 671

WERNER, P. The development of malignant tumors of the female genitalia following deep x-ray therapy for benign conditions, (Abst.), 137

WHITE, C. On contraction and retraction rings, 364

WHITE, R. J. Report of a case of decidual reaction in adenomyoma of rectovaginal septum, 112

WILENS, (WITH HALSTED). The need for a urologic department in every gynecologic clinic, 702

WILLIAMS, J. WHITRIDGE, AND KO CHI SUN. A statistical study of the incidence and treatment of labor complicated by contracted pelvis in the obstetric service of the Johns Hopkins Hospital from 1896 to 1924, 735, 861

WILLIAMS, P. F. Vulvovaginitis in infants and young children, 487, 529

WILLIAMSON, H. C. Application of the forceps to the transverse head for delivery of persistent occipitoposterior cases, 37, 120

WING, L. A. Report of a case of gangrene of the cecum in a newborn infant, 510, 521

WITTER, MARGARET S., AND ELLIOTT, W. P. Postoperative leucocytosis, 555

WULFF, H. False perforation of the uterus—relaxation of the uterus, (Abst.), 550

SUBJECT INDEX

A

- Abdominal incision, infection of the, incidence in five hundred gynecologic laparotomies, Macfarlane, Catharine, 630, 692
- Ablatio placentae, Welz, Walter E., 842
- Abortion, (Abst.), 547
 - and puerperal sepsis, the treatment of, Ten Berge, (Abst.), 554
 - febrile, collective statistics on the treatment of, Dietrich, (Abst.), 553
 - intrapерitoneal hemorrhage complicating, Downing, W. L., 503
 - management of, Gordon, (Abst.), 552
 - septic, active or conservative treatment of, Grabich, F., (Abst.), 553
 - simultaneous, and sterilization, Dützmänn, M., (Abst.), 724
 - therapeutic, hysterectomy in certain cases of pulmonary tuberculosis; particularly as an alternative for, Baldwin, J. F., (Abst.), 724
 - threatened, Van Donge, (Abst.), 548
 - treatment of incomplete, Herzstein, J., and Davis, Irene, 577
- Abortions, a contribution to the management of, Gotting, F., (Abst.), 551
 - and premature labors, proposal for a standard of operative technic in, Kehrer, (Abst.), 549
 - febrile, on the treatment of, Pelkonen, (Abst.), 553
 - quinine therapy in, Henrard, E., (Abst.), 554
 - technic of cleaning out, basic principles in the, Franque, v. O., (Abst.), 550
 - treatment of, Tuttle, H. K., (Abst.), 552
- Abstracts, selected:
 - Abortion, 547
 - Anesthesia in labor, 434
 - New growths, 135
 - Pregnancy complicated by disease, 547
 - Syphilis, 278
- Actinomycosis of the tubes and ovaries, report of a case of, Draper, J. W., and Studdiford, W. E., 603, 701
- Adenomyoma of rectovaginal septum, report of a case of decidual reaction in, White, R. J., 112
- American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, Thirty-eighth an-

Am. Assn. Obst., etc.—Cont'd

- annual meeting, September, 1925, President's Address, Davis, A. B., 147
 - transactions of, 247, 404, 516, 682
- Amputation, supravaginal, and castration in tuberculous women, results of, Siebert, F., (Abst.), 724
- Analgesia in obstetric and gynecologic practice, clinical study of a new, Manna, A., (Abst.), 436
- rectal ether, in childbirth, Harrar, (Abst.), 438
- Anemias, the severe, of pregnancy and the puerperium, Larrabee, (Abst.), 729
- Anesthesia, ether, the study of the effect of, on the isoagglutinins of human blood, Reichart, P., and Beake, M., 568
 - in labor, (Absts.), 434
 - spinal, in obstetrics, Vandesial, R., (Abst.), 437
- Appendicitis, acute, incarcerated in a right inguinal hernia, Salatch, P. B., 417
 - chronic, an inquiry into the nature of, Hertzler, A. E., 155, 247
 - five kinds of chronic, Morris, R. T., 180, 247
 - right rotation of the appendix from congenital bands as a factor in the etiology of, Outland, J. H., 247
- symposium on, 247
- vermiform, endometrial adenoma (implantation) in the, Seelig, M. G., 461

B

- Bacteriologic examination, a method of obtaining vaginal secretion for, without the possibility of vulval contamination, Harris, J. W., and Brown, J. H., 497
- Bartholin gland, cysts of the, Berard, L., and Dunet, C., (Abst.), 135
- Birth injuries, intracranial, cistern puncture in, Dunham, Berman, S., 833
 - the mechanics of, their cause and prevention, Newman, J. W., and Levy, W. E., 645, 696
- Blood sedimentation, the relation of, to pelvic disorders, Cherry, T. H., 105
- Breast, supernumerary, near labium, Bell, J. W., 507

C

- Cancer of the breast, growth of, during pregnancy, Vignes, (Abst.), 733
- Carcinoma and pregnancy with especial reference to mammary carcinoma, Odermatt, W., (Abst.), 733
- cervical, and gestation, Vignes, (Abst.), 731
- complication of pregnancy with, Schweitzer, (Abst.), 732
- uteri, the radium treatment of, Ward, G. G., and Farrar, Lilian, K. P., 439
- Cecum, gangrene of the, in a newborn infant, report of a case of, Wing, L. A., 510, 521
- Cervicitis, chronic, the passive hyperemia treatment of, Moench, G. L., 637
- erosion and laceration of the cervix uteri from the standpoint of pathology, Moench, G. L., 453
- Cervix, carcinoma in the, the incidence of, following supravaginal hysterectomy, Hochman, S. S., 566
- chancre of the, with report of two cases, Cron, R. S., 378
- fibromyoma of, large, Christopher, F., 668
- Cesarean section, indications for, Van Sweringen, B., 201, 256
- Cistern puncture in intracranial birth injuries, Dunham, Berman S., 833
- Collective reviews:
- A review of the gynecologic literature of 1925, Schochet, S. S., and Lackner, J. E., 534
- New books, Frank, R. T., 122
- The obstetric literature of 1925, Greenhill, J. P., 708, 869
- The relation of the endocrine system to pregnancy, Capper, A., 269
- Colon, diverticulitis of the, Erdmann, J. F., 609, 682
- Contraction and retraction rings, White, C., 364
- Cord, macerated premature twins with six true knots of the, Miller, H. E., 695
- Correspondence, 143, 703, 881
- Cyst, suppurating teratomatous, in the splenic region, Spencer, (Abst.), 142
- Cysts, gynecologic surgery of, included in the iliopelvic mesentery, Becerro de Bengoa, R., (Abst.), 142
- of the Bartholin gland, Berard, L., and Dunet, C., (Abst.), 135
- vaginal, on the pathology of, Baulieu-Burla, (Abst.), 135

D

- Delivery, injuries of the infant during, Bland, P. B., 477, 529
- District Nursing Association of Buffalo, 514
- Duodenal ulcer from partial obstruction of the duodenojejunal junction, Sloan, E. P., 492, 523
- Dystocia, fetal, a case of, Thoms, Herbert, 839, 861

E

- Eclampsia, improved prophylactic method of treating, with comments on the variations suggested by Williams, Stander, Speidel, and King, Stroganoff, B., 756
- intramuscular injection of magnesium sulphate for the control of convulsions in, Dorsett, L., 227, 262
- Ectopia viscerum, rachischisis, malformation of the sacrum, pelvis inversa, hypoplasia of the thoracic duct, agenesis or hypoplasia of various abdominal viscera and placenta previa, report of a case of, Mills, R. G., and Walpert, B. E., 19
- Ectopic pregnancy, the differential diagnosis of, Frommer, E. M., (Collective Review), 423
- Elephantiasis, congenital cystic, phomomelus with, Harris, H. A., 767
- Epitheliomas, early pregnancy and, Emery, (Abst.), 733
- Ethylene in obstetrics, Heaney, N. S., (Abst.), 437

F

- Fallopian tube, sarcoma of the, Dodd, W. E., (Abst.), 138
- torsion of the normal, Darner, H. L., 368
- Fetal degeneration, intrauterine, Umbach, J., (Abst.), 549
- dystocia, a case of, Thoms, Herbert, 839, 867
- Fetus, danger of malformation of, in roentgen-ray treatment during pregnancy, Ries, E., 361
- intrauterine death of, experimental studies of, Ogasawara, K., (Abst.), 548
- Fetuses, dead, the retention of in the uterine cavity, Karlin, M., (Abst.), 548
- Forceps, Dewees, description of, Norris, R. C., 523
- Kielland, observations upon the use of the, Schumann, E. A., 525
- obstetric, symposium on the, 523

G

- Gestation, a case of acute tuberculosis (meningitic and hypophyseal) at the beginning of, Fruhinsholz, A., and Collin, R., (Abst.), 726
 and nephrectomy for renal tuberculosis, Favreau and Querrioux, (Abst.), 725
 Glucose and insulin in the toxemias of pregnancy, Miller, C. Jeff, 763, 865

H

- Hemorrhage, followed by shock and acidosis with immediate recovery after the administration of glucose and insulin, Levy, W. E., 864
 Hernia, congenital, at the linea alba, Charlton, H. R., 103, 120
 Hyperemesis gravidarum, the use of fluids in the treatment of, Harding, V. J., and Van Wyck, H. B., 1
 Hysterectomy in certain cases of pulmonary tuberculosis; particularly as an alternative for therapeutic abortion, Baldwin, J. F., (Abst.), 724

I

- Icterus gravidarum, a case of, Boreel, (Abst.), 730
 Impetigo contagiosa neonatorum, notes on the etiology and epidemiology of, Belding, D. L., 70
 Instrument designed for use on the aftercoming head, a special, Piper, E. B., 523
 Insulin and glucose in the toxemias of pregnancy, Miller, C. Jeff, 763, 865

J

- Janiceps asymmetros, with the report of a case, Pack, George T., and Berrey, Ivan C., 779

K

- Kielland forceps, observations upon the use of the, Schumann, E. A., 525

L

- Labor after cesarean section, the conduct of, Gladden, A. H., Jr., 642, 698
 analgesia in, Van Hasselt, (Abst.), 434
 by means of hypnosis, Koster, (Abst.), 434

Labor—Cont'd

- an investigation into the causation of the onset of, by parabiosis during pregnancy, Kross, I., 64
 complicated by contracted pelvis, incidence and treatment of, in the obstetric service of the Johns Hopkins Hospital 1896 to 1924, J. Whitridge Williams and Ko Chi Sun, 735, 861
 with malignant growth, Davies, J. C., (Abst.), 733
 in breech presentations, elimination of the second stage of, Irving, F. C., and Goethals, T. R., 80
 management of, the relation of the physiology and mechanics to the, Fowler, W. A., 212, 256
 mechanics of, symposium on the, 256
 under hypnosis for the clinical physician, Franke, (Abst.), 435
 Leucemia of pregnancy, a case of, Ohlsson, I., (Abst.), 729
 Leucocytosis, postoperative, Witter, Margaret S., and Elliott, W. P., 555
 Lipoma of the broad ligament, Rawls, R. M., 410

M

- Maternal welfare, department of, 244, 514, 516, 671, 854
 meeting of the Joint Committee on, May 3, 1925, 244
 report of the Joint Committee on, 516
 Menopause, the radiotherapeutic: its significance and management, Corseaden, James A., 803, 856
 Menstruation and pregnancy in Hodgkin's disease, Gemmel, (Abst.), 728
 Mesenteric cyst, report of a case of, Clark, E. D., 238, 267
 Mirror, a delivery room, Kane, H. F., 533

N

- New books, Frank, R. T., (Collective Review), 122
 Newborn, prevention of tuberculosis in the, Debre, R., (Abst.), 723
 New growths, (Abst.), 135
 New Orleans Gynecological and Obstetrical Society, transactions of, 471, 695, 863
 New York Academy of Medicine, Section on Obstetrics and Gynecology, Transactions of, 701
 New York Obstetrical Society, transactions of, 118, 410, 688, 856, 861

Nipple, human, sebaceous glands in the, Perkins, Orman, C., and Miller, Adam M., 789

O

Obstetric anesthesia and analgesia, Danforth, W. C., (Abst.), 434
 mortality, an analysis of the cases at the Lying-In Hospital in 1924, Renssolin, M., 96, 121
 shock, Stone, E. L., 650
 Obstetrical analgesia produced by somnifene, Riss, (Abst.), 435
 anesthesia produced by means of the ureic compounds, Delmas, P., and Roume, A., (Abst.), 436
 produced by somnifene, Dujol and Clement, (Abst.), 436
 heresies at the Brooklyn Hospital, Smith, W. S., 414
 literature of 1925, Greenhill, J. P., (Collective Review), 708, 869
 Society of Philadelphia, transactions of, 523, 690 and the Philadelphia Pediatric Society, Joint meeting of, transactions of, 529
 Obstetrics, lectures in, to county societies in New York State, 854
 Occiput posterior, the, Toombs, P. W., 206, 256
 Occipitoposterior cases, persistent, application of the forceps to the transverse head for delivery of, Williamson, H. C., 37, 120
 Osteogenesis imperfecta, Telfair, J. H., 860
 Ovary, a case of hypernephroma of the, Levy-Du Pan, (Abst.), 140
 cystadenoma of the, with report of cases, Mayer, G. A., 383, 421
 heterotopic epithelial growths in the genital organs, especially the, (Abst.), 140
 proliferation of uterine mucosa in the, and their relationship to chocolate cysts, Von Oettingen, K., and Linden, H., (Abst.), 140
 incidence and end-results of carcinoma of the, Byron, C. S., and Berkoff, H. A., 559
 theoretical and practical consideration arising from the study of endometrial-like epithelial growths in the, Vogt, E., (Abst.), 139
 thyroid tumor of the, Kovacs, F., (Abst.), 141
 Outlet pelvimetry and its importance, McCormick, C. O., 794
 Oviduct insufflation, based on a study of 400 cases, Rongy, A. J., 616, 655

Ovum and fetus, syphilis of the, Levy-Solal, (Abst.), 282

P

Parotitis, postoperative, with a report of a case, Peightal, T. C., 88, 118
 Pelvimetry, outlet, and its importance, McCormick, C. O., 794
 Pemphigus neonatorum, on a possible cause for, Krigbaum, R. E., 494
 Perineum, the protection of the, Villarama, Antonio, 823
 Phocomelus with congenital cystic elephantiasis, Harris, H. A., 767
 Physometra, two cases of, Heim, (Abst.), 554
 Placenta previa, an analysis of seventy-nine cases of, Lieberman, Barnard L., 814
 treatment of, based on a study of 303 consecutive cases at the Boston Lying-In Hospital, Kellogg, F. S., 194, 252
 prolapse of the, Rucker, M. P., 189, 252
 syphilis of the, in the Negro, McCord, James R., 850
 Placental pathology, symposium on, 252
 Posttransfusion reactions. A review of 190 transfusions performed at the Woman's Hospital, New York City, Souter, M. C., and Duryea, G. D., 569
 Pregnancy, a case of pernicious vomiting of, cured by the use of duodenal tube, in which death ensued later from myocarditis, King, E. L., 418
 and labor, cardiac deaths in, Wagner, G. A., (Abst.), 719
 and the puerperium, bacterial infection of the urinary tract complicating, Hewitt, (Abst.), 731
 weight estimates during, Kerwin, W., 473
 anemia, pernicious-like of, Rumpf, (Abst.), 728
 appendicitis in, Royston, G. D., and Fisher, A. O., 184, 247
 carbohydrate tolerance in, Host, (Abst.), 726
 clinical experiences in tuberculosis complicating, Neumann, W., (Abst.), 722
 complicated by disease, (Abst.), 718
 complicating heart disease, Pardee, (Abst.), 720
 diabetes and, Rathery, (Abst.), 727
 early, and epitheliomas, Emery, (Abst.), 733
 full-term extrauterine, with report of three cases, DeDoux, L. A., 395, 420

Pregnancy, full-term—Cont'd

- intraligamentous, Stallworth, W. L., 863
- genital tuberculosis and, Fruhinsholz and Feuillade, (Abst.), 725
- heart disease in, Robinson, (Abst.), 718
- prognosis of, Frey, (Abst.), 721
- relation to marriage and, Herrick, (Abst.), 720
- failure in, the significance of, Schmidt, H. R., (Abst.), 719
- output during, Stander, H. J., Duncan, E. E., and Sisson, W. E., 44
- incidence of glycosuria during, Crook, (Abst.), 727
- incompatibility of, and fibroids in the uterus, Mosher, G. C., 404
- in the remaining horn of a uterus didelphys after torsion and partial hysterectomy, Caswell, C. E., 853
- menstruation and, in Hodgkin's disease, Gemmel, (Abst.), 728
- myoma operations, conservative, during, Boije, O. A., (Abst.), 734
- myomectomy during, Cotte and Crysel, (Abst.), 734
- ovarian, report of a case of true, Manley, J. R., 512
- ovaries and, tuberculosis of, Vautrin, (Abst.), 725
- parturition and tuberculosis, marriage in, Ward, (Abst.), 721
- pernicious anemia of, Aubertin, C., (Abst.), 728
- pulmonary tuberculosis associated with, therapeutic indications in, Cleisz, L., (Abst.), 721
- purpura hemorrhagica complicating, Liebling, Philip, 847
- pyelitis of, a case of, caused by B. typhosus, Voza, F., (Abst.), 731
- pyelonephritis in, Duvergy and Dax, (Abst.), 730
- renal tuberculosis during, Stephens, W. E., (Abst.), 725
- Sachs-Georgi flocculation reaction in, Bathe, (Abst.), 278
- syphilis and, studies on, Kluftan and Kalman, (Abst.), 282
- in relation to, Nathanson, (Abst.), 283
- toxemia of, observations on the treatment of the edema of the, with ammonium chloride, Mussey, R. D., 222, 262
- toxemias of, glucose and insulin in the, Miller, C. Jeff, 763, 865
- of the latter half of, a classification of the, Stander, H. J., and Peckham, C. H., 583
- vomiting of, its causation and its treatment by ovarian extract, Carter, Philips J., 823, 866

Pregnancy—Cont'd

- what is the correct therapy in the treatment of, complicated by pulmonary tuberculosis? Pankow, O., (Abst.), 722
- Pregnancies, blood pressure and urinary findings in 100 cases of normal, Faught, F. A., 633, 693
- Prenatal care, the development of, in Detroit, Welz, W. E., 671
- charts, a critical analysis of 250, Hebert, J. S., 387
- Preparation of the external genitalia for delivery with iodine-alcohol, Lankford, B., 219, 256
- Profeta's immunity, Fischl, (Abst.), 283
- Purpura hemorrhagica, complicating pregnancy, Liebling, Philip, 847
- Pulmonary tuberculosis, the future of children born of women with, Couvelaire, M. A., (Abst.), 723
- Pyelitis as a postoperative complication, Maloney, W. M., and Graceo, F. H., 579

S

- Sarcoma of the fallopian tube, Dodd, W. E., (Abst.), 138
- of the uterus, clinical and statistical study of, Steinhardt, B., (Abst.), 137
- Scopolamine, death from, Baumann, (Abst.), 437
- Sebaceous glands in the human nipple, Perkins, Orman C., and Miller, Adam, M., 789
- Sedimentation test in pelvic diseases of the female, Schmitz, A. M., and Schmitz, H., 353, 409
- Society transactions:
- American Association of Obstetricians, Gynecologists, and Abdominal Surgeons, 147, 247, 404, 516, 682
- New Orleans Gynecological and Obstetrical Society, 417, 695, 863
- New York Academy of Medicine, 701
- New York Obstetrical Society, 118, 410, 688, 856, 861
- New York and Philadelphia Obstetrical Societies, Joint Meeting, 529
- Obstetrical Society of Philadelphia, 523, 529, 690
- Somnifene, obstetrical anesthesia produced by, Dujol and Clement, (Abst.), 436
- Sterility-fertility studies in animals and their bearing on human problems, Dickinson, R. L., 51

- Sterilization, simultaneous abortion and, Dützmänn, M., (Abst.), 724
- Stillbirths, the prevention of, Hannah, C. R., 231, 263
- Surgery, radium and roentgen rays in the treatment of carcinoma of the cervix, Bowing, H. H., 400
- Syphilis, (Absts.), 278
- congenital at birth through demonstration of spirochetes in the umbilical cord, on the early diagnosis of, Vulovic, L., (Abst.), 279
- during gestation and confinement, Vignes, (Abst.), 279
- fetal, Tvedegaard, G., (Abst.), 281
- influence of pregnancy on the Wassermann reaction and on the clinical manifestations of, Browne, (Abst.), 278
- of the placenta in the Negro, McCord, James R., 850
- the relation of, to obstetrics, Roberts, C. S. L., (Abst.), 281
- Syphilitic backache, Thompson, W. (Abst.), 284
- placentas, the histopathology of, and its clinical importance, Mönckelberg, C., and Aviles, M., (Abst.), 280

T

- Theses by undergraduate students of medicine, 555
- Toxemias of pregnancy, glucose and insulin in the, Miller, C. Jeff, 763, 865
- Treatment of labor complicated by contracted pelvis in the obstetric service of the Johns Hopkins Hospital from 1896 to 1924, Williams, J. Whitridge, and Ko Chi Sun, 735, 861
- Tumors, development of malignant, of the female genitalia following deep x-ray therapy for benign conditions, Werner, P., (Abst.), 137
- habits (ecology) of, Bland-Sutton, J., (Abst.), 136
- retroperitoneal and mesenteric, Schmid, H. H., (Abst.), 142
- Twilight sleep in China, Lin, M. H. D., (Abst.), 437

U

- Unborn in obstetrics, the value of the life of the, Emery, H., (Abst.), 547
- Urethra, extrameatal prolapse of the, with the report of a case having an acute onset, Dannreuther, W. T., 468, 522

- Urologic department, the need for a, in every gynecologic clinic, Halsted and Wilens, 702
- Uterine leiomyomata, malignant degeneration of, Sims, H. V., 697
- prolapse at the Woman's Hospital, 1915-1925, a study of end-results of operation for, Bul-lard, E. A., 632, 688
- tube, a study of xanthoma of the, Daniel, C., and Babes, A., (Abst.), 141
- Uterus, adenomyoma of the, with tuberculous infection, Johnstone, (Abst.), 138
- and adnexa, syphilis of the, Portis, B. (Abst.), 284
- cancer of the, radium treatment of, Ward, Geo. G., 690
- didelphys, pregnancy in the remaining horn of a, after torsion and partial hysterectomy, Caswell, C. E., 853
- false perforation of the, Wulff, H., (Abst.), 550
- inversion of the, Holden, F. C., 412
- Phaneuf, L. E., 171, 252
- complete, Oastler, F. R., 410
- mixed tumors of the, Petersen, (Abst.), 138
- precancerous lesions of the, Findley, P., 450, 519
- perforations of the, and their treatment, Heyn, (Abst.), 551
- supravaginal amputation of the, in severe postabortive bleeding, Hellendall, (Abst.), 554
- sarcoma of the, clinical and statistical study of, Steinhart, B., (Abst.), 137
- spontaneous rupture of the, in labor following Sturmdorff tracheloplasty, Eastman, N. J., 500
- treatment of fibroids of the, Weiss, E. A., 404

V

- Vena cava, ligation of inferior, Pfaff, O. G., 682
- Version and extraction, podalic, report of a case of separation of the dorsal vertebrae in, Barney, W. R., 116
- Vulvovaginitis in infants and young children, Williams, P. F., 487, 529

X

- Xanthoma of the uterine tube, a study of the, Daniel, C., and Babes, A., (Abst.), 141

